REMEDIAL INVESTIGATION WORK PLAN

for

BRONX KINGSBRIDGE ARMORY SITE
1 West Kingsbridge Road
Block 3247, Lot 10
Bronx, New York

Prepared For:

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CERTIFICATION

I, Paul McMahon, certify that I am currently a Qualified Environmental Professional as defined in 6 New York Codes, Rules, and Regulations (NYCRR) Part 375 and that this Remedial Investigation Work Plan was prepared in accordance with all applicable statutes and regulations and in substantial conformance with the New York State Department of Environmental Conservation (NYSDEC) Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation.

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1.0 INTRODUCTION

This Remedial Investigation Work Plan (RIWP) was prepared on behalf of 8th Regiment Partners LLC (the Applicant) for the Bronx Kingsbridge Armory Site at 1 West Kingsbridge Road (Bronx County Tax Block 3247, Lot 10) in Bronx, New York (the "site"). This RIWP is being submitted concurrently with a New York State Department of Environmental Conservation (NYSDEC) Brownfield Cleanup Program (BCP) Application for the site. The Applicant is proposing the enter the BCP as a Volunteer.

The objective of the Remedial Investigation (RI) is to investigate and characterize the nature and extent of environmental impacts at the site and to provide sufficient information to evaluate remedial alternatives and threats to human health and the environment. This RIWP was developed in accordance with the process and requirements identified in the NYSDEC Division of Environmental Remediation (DER)-10 Technical Guidance for Site Investigation and Remediation (May 2010), the New York State Department of Health (NYSDOH) "Guidance for Evaluating Soil Vapor Intrusion in the State of New York, with updates" (October 2006), and the NYSDEC "Guidelines for Sampling and Analysis of Per- and Polyfluoroalkyl Substances (PFAS) Under NYSDEC's Part 375 Remedial Programs" (April 2023).

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2.0 SITE BACKGROUND

2.1 Site Description

The approximately 5.6-acre site is identified on the Bronx Borough Tax Map as Block 3247, Lot 10 and is located at 1 West Kingsbridge Road in the Bronx, New York. The site is developed with an approximately 200,000-square-foot, multi-story former military facility (armory building) on the majority of the site. The remainder of the site comprises access roadways, concrete and asphalt-paved areas, and landscaped areas to the north, west and south of the building.

The interior of the armory building consists of a central drill hall at ground level with an arched framing roof that extends about 110 feet above the floor of the drill hall. Beneath the drill hall are two basement levels, identified as the basement and basement mezzanine. These two levels were formerly used by the Army National Guard, with the lower level occupied by offices, a garage and vehicle storage area, a gymnasium, rifle and pistol ranges with earthen floors, and other ancillary rooms. In the southern part of the building, a crawl space is present at the sub-basement level. Above the drill hall there are four, three- to five-story towers in the southern part of the building, which previously contained offices and residential quarters. The site has been largely vacant for thirty years since the City of New York acquired the site in 1996. It has only occasionally been used for events held within the central drill hall.

The site is at the center of the city block bound by West 195th Street to the north, Jerome Avenue and an elevated New York City Transit (NYCT) structure (4 Train) to the east, West Kingsbridge Road to the south, and Reservoir Avenue to the west. A site location map and site plan are included as Figures 1 and 2, respectively.

According to the New York City Zoning Resolution and Map, the site is located within an MX-30 special purpose mixed-use designation which pairs M1-4A and R7-2 zoning districts, which permits residential uses and select commercial and light industrial uses. The site is currently subject to a rezoning action and associated land use approvals to facilitate redevelopment of the Kingsbridge Armory site, which is consistent with the proposed redevelopment plan for the site.

2.2 Surrounding Property Land Use

The site is located in an area that is characterized by residential, commercial, and institutional properties. The following table summarizes adjoining and surrounding property usage:

Direction	Adjoining Properties	Surrounding Area
North	New York Army National Guard buildings (10 West 195th Street)	West 195th Street followed by schools and public institutions
East	Jerome Avenue and the Metropolitan Transportation Authority (MTA) 4 Train followed by mixed-use commercial and residential building (2700 Jerome Avenue) and a commercial and office building (1 East Kingsbridge Road)	Mixed-use commercial and residential buildings
South	West Kingsbridge Road followed by commercial and office buildings (2, 26, 40, and 50 West Kingsbridge Road, and 2650 Davidson Avenue) and open space (1690 Reservoir Avenue)	Residential, commercial, and institutional buildings
West	Reservoir Avenue followed by multi-family and one-family residential buildings (2745 and 2727 Reservoir Avenue), mixed-use commercial and residential buildings (2691 Reservoir Avenue and 2724 University Avenue), Fordham Manor Church (2703 Reservoir Avenue), and an auto repair shop, Armory Auto Parts & Repair, Inc. (2717 Reservoir Avenue)	Mixed-use commercial and residential, and institutional buildings

Major infrastructure (storm drains, sewers, and underground utility lines) exists within sidewalks, streets, and properties surrounding the site. The nearest ecological receptor is the Harlem River, located approximately 0.59 miles west of the site. Sensitive receptors within ½-mile of the site include the following:

Name (Approximate distance from Site)	Address
P.S. 340 (approximately 0.03 miles northwest)	25 West 195th Street, Bronx, NY 10468
KIPP Bronx Charter School II ("Inquire Elementary School") (approximately 0.1 miles east)	2720 Jerome Avenue, Bronx, NY 10468
P.S. 86 The Kingsbridge Heights School (approximately 0.2 miles northwest)	2756 Reservoir Avenue, Bronx, NY 10468
Discovery High School (approximately 0.2 miles northwest)	2780 Reservoir Avenue, Bronx, NY 10468
High School for Teaching and the Professions (approximately 0.2 miles northwest)	2780 Reservoir Avenue, Bronx, NY 10468
Kingsbridge International High School (approximately 0.2 miles northwest)	2780 Reservoir Avenue, Bronx, NY 10468
Gods Angels Daycare Inc. (approximately 0.2 miles southwest)	2776 Parkview Terrace, Apt. 1A, Bronx, NY 10468
James J. Peters Department of Veterans Affairs Medical Center (approximately 0.2 miles west)	130 West Kingsbridge Road, Bronx, NY 10468

Name (Approximate distance from Site)	Address
The Plaza Rehabilitation and Nursing Center (approximately 0.2 miles west)	100 West Kingsbridge Road, Bronx, NY 10468
The New Jewish Home University Avenue Assisted Living (approximately 0.3 miles south)	2553 University Avenue, Bronx, NY 10468
D'Jesus Daycare and 3K Program (approximately 0.3 miles northeast)	50 E 191st Street, Bronx, NY 10468
Paradise Group Family Daycare (approximately 0.3 miles northwest)	2850 Webb Avenue, Bronx, NY 10468
Santana Soriano, Arabel (approximately 0.4 miles southwest)	200 West Kingsbridge Road, Apt. 3L, Bronx, NY 10463
Lehman College, City University of New York (approximately 0.3 miles north)	250 Bedford Park Boulevard West, Bronx, NY 10468
SUNY Bronx Educational Opportunity Center (approximately 0.3 miles southeast)	2467 Jerome Avenue, Bronx, NY 10468
Little Bright Minds NYC Group Family Daycare (approximately 0.3 miles northwest)	2809 Clafin Avenue, Bronx, NY 10468
Start of A New Home Daycare Corp. (approximately 0.3 miles northwest)	2849 Webb Avenue, Apt. 3B, Bronx, NY 10468
Tiny Blessings Daycare (approximately 0.3 miles east)	2710 Morris Avenue / 2600 Creston Avenue, Bronx, NY 10468
P.S. 246 Poe Center (approximately 0.4 miles southeast)	2641 Grand Concourse, Bronx, NY 10468
Tolentine Zeiser Community Life Center, Inc. (approximately 0.4 miles west)	2340 Andrews Avenue, Bronx, NY 10468
Lali's Daycare (approximately 0.4 miles northeast)	2800 Creston Avenue, Apt. 1A, Bronx, NY 10468
Kingsbridge Heights Community Center / NYCEEC (approximately 0.5 miles northwest)	3101 Kingsbridge Terrace, Bronx, NY 10463
Early Learning Family Group Daycare (approximately 0.6 miles northeast)	315 E 196th Street, Apt. 2H, Bronx, NY 10458
Blessing from Heaven Daycare Corp. (approximately 0.6 miles east)	2558 Grand Concourse, Apt. 2C, Bronx, NY 10458
The New School for Leadership and the Arts (approximately 0.8 miles northwest)	120 231st Street, Bronx, NY 10463

2.3 Proposed Redevelopment Plan

Proposed redevelopment plans are in progress but are expected to include the renovation of the on-site armory building into a multi-use commercial building including an events venue,

entertainment and arcade area, museum, cultural center, community space, light manufacturing incubators, space for the National Guard, and parking and loading areas.

2.4 Site Physical Conditions

2.4.1 Topography

Based upon a draft topographic, boundary, and utility survey, prepared by Langan, dated July 10, 2026, the site is at an elevation ranging from approximately elevation (el) 130 to 143 feet[1]. The highest elevations occur along the western and southwestern portions of the site adjacent to Reservoir Avenue (approximately el 142 to 143 feet), while the lowest elevations are located along the eastern portions of the site (approximately el 130 to 131). The topography on site slopes downward from west to east.

2.4.2 Geology

Based on previous geotechnical and environmental reports, the site is underlain by non-native fill, consisting of coarse- to fine-grained sand with silt, gravel, brick, and rock, to depths ranging from about 6 to 25 feet below grade surface (bgs). The non-native fill is underlain by silty sand, which varies in thickness from about 3 to 37 feet. Decomposed rock and bedrock consisting of grey mica gneiss was encountered beneath the silty sand at depths between about 9 to 58 feet bgs.

Based on review of the USGS Bedrock and Engineering Geologic Maps of Bronx County and Parts of New York and Queens Counties, New York, by Charles A. Baskerville (1992), the site is underlain by quartz, plagioclase, and biotite and is part of the Fordham Gneiss geologic unit.

2.4.3 Hydrogeology

Groundwater flow is typically hydraulically influenced, as shallow groundwater tends to originate in areas of topographic highs and flow toward areas of topographic lows, such as rivers, stream valleys, ponds, and wetlands. A broader, interconnected hydrogeologic network often governs groundwater flow at depth or in the bedrock aquifer. Groundwater depth and flow direction are also subject to hydrogeologic and anthropogenic variables such as precipitation, evaporation, extent of vegetative cover, and extent of impervious cover. Other factors influencing groundwater include depth to bedrock, the presence of artificial fill, and variability in local geology and groundwater sources or sinks.

Based on previous environmental and geotechnical reports for the site, groundwater was encountered at the site at depths ranging from about 9 to 30 feet bgs throughout the site and is inferred to flow to the southwest. According to the current Federal Emergency Management

[1] All elevations are in feet and referenced to North American Vertical Datum of 1988 (NAVD88).

Agency (FEMA) Flood Insurance Rate Map (FIRM) dated September 5, 2007 (Map No. 3604970082F), the site is located outside of the 0.2% annual chance floodplain.

2.5 Site Environmental History

Previous reports for the site include a 2000 Environmental Survey Report (prepared by ATC), a 2006 Phase I Environmental Site Assessment (ESA) (prepared by M&E), a 2007 Phase II ESA (prepared by TRC Environmental Corporation), and a 2008 Phase II ESI, 2008 Geotechnical Investigation, 2008 Asbestos Investigation Report, 2009 Supplemental Groundwater Investigation, 2013 Phase II ESI, 2019 Limited Hazardous Building Materials Survey Report, and May 2026 Phase I ESA prepared by Langan. Information relevant to the site is summarized below.

Phase I ESAs

A Phase I ESA was prepared by M&E for the site and the northern adjoining property in September 2006. At the time of site reconnaissance, the armory building was vacant. The September 2006 Phase I ESA identified two potential recognized environmental conditions (RECs) and one business environmental risk (BER). The RECs were associated with: 1) historical site operations; and 2) deteriorating 55-gallon drums in a vehicle storage area. The BER was related to the documented presence of asbestos-containing materials and lead-based paint at the site, identified in a previous Environmental Survey Report prepared by ET Environmental in September 2000.

The 2026 Phase I ESA prepared by Langan identified three RECs, one de minimis condition, and four BERs, as summarized below.

The following RECs were identified: 1) historical operations and documented contamination at the site; 2) aboveground storage tanks (ASTs) observed at the site during the site reconnaissance; and 3) historical use of adjoining properties including automotive repair shops at an eastern adjoining property (2704 Jerome Avenue) and western adjoining property (2717 Reservoir Avenue), a gasoline station at the western adjoining property (2717 Reservoir Avenue), and dry cleaners at a southern adjoining property (40 West Kingsbridge Road) and western adjoining property (2691 Reservoir Avenue).

During the site reconnaissance, areas of localized de minimis staining were observed on the concrete slab throughout the vehicle storage area in the northern part of the armory building. The concrete slab appeared to be in good condition and the staining did not extend across any cracks or breaks within the concrete, or across floor drains within the building.

The following BERs were identified: 1) E-Designation at the site; 2) drums observed at the site during the renaissance; 3) monitoring wells observed at the site during the reconnaissance; and

4) asbestos-containing materials (ACM), lead-based paint (LBP), and hazardous building materials previously identified at the site.

Asbestos-Containing Materials and Hazardous Building Materials Surveys

ACM and hazardous building materials surveys were conducted at the site in 2000, 2008, and 2019. Based on previous reports for the surveys conducted, ACM, assumed ACM, LCP, and universal/hazardous waste articles are identified within the site building.

ACM, assumed ACM and LCP were identified throughout most of the interior of the armory building. Universal and hazardous waste articles identified during the surveys included fluorescent light ballasts, fluorescent light bulbs, MEC thermostat, high intensity discharge (HID), mercury containing equipment, batteries, and miscellaneous chemicals. The presence of ACM, LCP, and hazardous building materials is considered a BER.

The 2000 environmental survey of the building also identified four underground storage tanks (USTs) based on the observations of fill ports and vent pipes throughout the site; one in the western parking area, two USTs associated with the maintenance garage, and one UST associated with the heating plant of the National Guard office and garage. The survey also identified seven additional 275-gallon ASTs in the basement southeast hallway opposite the shooting ranges. The contents of these ASTs were unknown, with the tanks reportedly not included in the Petroleum Bulk Storage (PBS) listing for the property.

Previous Environmental Site Assessments

Investigations have been conducted at the site between 2007 and 2013 and included geophysical surveys, advancement of soil borings and test pits, the installation of groundwater monitoring wells and soil vapor points, and collection of soil, groundwater, and soil vapor samples throughout the site and the northern adjoining property. Results observed within the site boundaries are summarized below.

Geophysical surveys at the site identified an abandoned fill port and vent pipe along the western exterior of the armory building and a 30-foot-long by 30-foot-wide anomaly indicative of a potential UST along the western exterior of the armory building in 2000.

Non-native fill, primarily consisting of coarse- to fine-grained sand with silt, gravel, brick, concrete and weathered rock, was observed in soil borings and test pits to depths ranging from about 6 to 20 feet bgs. The fill layer was underlain by silty sands, followed by weathered rock and bedrock. Groundwater was encountered at depths between about 9 and 30 feet bgs.

Soil samples were collected from surface grade to depths up to 34 feet bgs. Analytical results from the previous soil samples are summarized below.

- Two volatile organic compounds (VOCs), acetone and methylene chloride, were detected in soil samples at concentrations above the NYSDEC Part 375 Protection of Groundwater (PGW) Soil Cleanup Objectives (SCOs) in soil samples.

- Eight semivolatile organic compounds (SVOCs), including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, and phenanthrene, were detected in soil samples at concentrations above the PGW and/or Restricted Use Commercial (RUC) SCOs.

- Two metals, barium and total chromium were detected in soil samples at concentrations above the PGW and RUC SCOs.

- Total lead was detected in soil samples at concentrations above the PGW and RUC SCOs in samples collected within the former rifle and pistol ranges in the armory building.

- Soil samples from within the rifle and pistol ranges in the armory building were also analyzed for the Toxicity Characteristic Leaching Procedure (TCLP) for lead. These samples identified lead at hazardous concentrations in soil at a maximum of 1,900 milligrams per liter (mg/L).

Analytical results from the previous groundwater samples are summarized below.

- Six VOCs, including 1,2,4-trimethylbenzene, benzene, ethylbenzene, isopropylbenzene, methylene chloride, and n-propylbenzene, were detected in groundwater samples at concentrations exceeding the NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1. Ambient Water Quality Standards (AWQS) and Guidance Values (collectively referred to as the NYSDEC SGVs).

- Three SVOCs, hexachlorobutadiene, naphthalene, and phenol, were detected in groundwater samples at concentrations above the NYSDEC SGVs.

- Three dissolved metals, including magnesium, manganese, and sodium, were detected at concentrations above the NYSDEC SGVs in groundwater samples.

Analytical results from the previous soil vapor samples are summarized below.

- Petroleum-related VOCs and chlorinated VOCs (CVOCs), including acetone, methylene chloride, n-heptane, n-hexane, tetrachloroethene (PCE), toluene, and trichloroethene (TCE), were detected in soil vapor samples.

- One VOC, TCE, was detected in one soil vapor sample at a concentration of 400 micrograms per cubic meter (µg/m^3), above the concentration for which mitigation is recommended when compared to the NYSDOH Decision Matrices.

2.6 Areas of Concern

The following areas of concern (AOC) were identified during previous investigations and will be further investigated during the RI. AOCs are shown on Figure 4.

AOC 1: SVOCs and Metal Impacts in Non-Native Fill

Non-native fill material was observed below the surface cover to depths ranging from 6 to 25 feet bgs throughout the site during previous environmental and geotechnical investigations. SVOCs, including benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, indeno(1,2,3-cd)pyrene, naphthalene, and phenanthrene, and metals, including barium, total chromium, copper, iron, magnesium, nickel, zinc, and lead, were detected at concentrations above their respective PGW and/or RUC SCOs in fill samples.

AOC 2: Hazardous Lead-Impacted Soil in Former Rifle and Pistol Ranges

Hazardous concentrations of lead (TCLP lead concentrations ranging from 5.1 milligrams per liter [mg/L] to 1,900 mg/L) were identified in multiple soil samples collected from 0 to 2.5 feet bgs in the vicinity of the former rifle and pistol range areas. The extent of hazardous lead concentrations has not been delineated.

AOC 3: Petroleum-Related VOCs in Groundwater and Soil Vapor

Petroleum-related VOCs including 1,2,4-trimethylbenzene, benzene, ethylbenzene, isopropylbenzene, and n-propylbenzene, were detected in groundwater samples collected from the northern and central parts of the site at concentrations exceeding the NYSDEC SGVs. Petroleum-related VOCs, including n-heptane, n-hexane, and toluene, were detected in soil vapor samples collected from the northern and central parts of the site.

AOC 4: Chlorinated Volatile Organic Compounds (CVOCs) in Soil Vapor

The CVOC, trichloroethene (TCE), was detected in one soil vapor sample (SV-4) collected in the central part of the site at a concentration of 400 µg/m^3, for which mitigation is recommended when compared to the NYSDOH Decision Matrices.

3.0 SCOPE OF WORK

The objective of the investigation summarized in this RIWP is to characterize the nature and extent of environmental impacts at and emanating from the site per Environmental Conservation Law (ECL) Article 27, Title 14 (Brownfield Cleanup Program) and DER-10. The rationale for each sampling location in relation to the AOCs and analytical parameters for each proposed sample are provided in Table 1 and proposed sample locations are shown on Figures 5A, 5B, 5C, and 5D. Hazardous building materials abatement and/or waste removal is anticipated to be required to facilitate the remedial investigation in portions of the building, including former locker rooms, storage areas, and other ancillary rooms throughout the basement and sub-basement, as the presence of these materials in current friable form pose an immediate environmental exposure risk to building occupants. The field tasks are discussed in more detail in the following sections.

<u>Geophysical Survey</u>

- Completion of a geophysical survey in all accessible areas of the site to clear sample locations and identify potential subsurface utilities and structures, including USTs. Sample locations may be relocated as necessary, based on the findings of the geophysical survey and other available utility information.

<u>Soil Boring Advancement and Sampling</u>

- Advancement of 25 soil borings throughout the site to about 35 feet below sidewalk grade (about 23 feet below basement grade) with a track-mounted Geoprobe and/or Sonic drill rig at soil boring locations. Soil borings to be converted to groundwater monitoring wells will be advanced to at least 5 feet below the observed groundwater interface.
- Collection of up to three samples from each of the 25 soil borings (plus quality assurance/quality control [QA/QC] samples) for laboratory analysis. Samples for laboratory analysis will be collected from within non-native fill, terminus of fill, and at the groundwater interface. If petroleum-like impacts are observed, additional samples may be collected.
- Advancement of up to 51 delineation soil borings positioned throughout the former rifle and pistol ranges in the basement of the armory building to attempt vertical and horizontal delineation of lead hazardous soil.
- Collection of up to four samples from each of the soil boring locations for vertical delineation of hazardous lead-impacted soil and laboratory analysis. The samples will be collected from the 0 to 1-foot, 1- to 2-foot, 2- to 3-foot, and 3- to 4-foot intervals.

Monitoring Well Installation and Sampling

- Installation of 10 permanent groundwater monitoring wells.
- Development of groundwater monitoring wells.
- Collection of one groundwater sample from each monitoring well (plus quality QA/QC samples) for laboratory analysis.
- Surveying and gauging the monitoring wells to measure groundwater elevation and evaluate flow direction.

Soil Vapor Sampling

- Installation of four soil vapor points to about 5 feet bgs or 2 feet above groundwater (whichever is shallower) in the exterior parts of the site.
- Installation of 13 sub-slab vapor points below the basement level.
- Collection of 6 indoor air samples co-located with the sub-slab vapor point locations.
- Collection of one outdoor ambient air sample.

Modifications to this scope of work may be required: 1) due to site equipment or access restrictions; 2) if contamination is observed and additional analytical data is warranted; and 3) to adequately characterize and delineate subsurface impacts in compliance with the applicable regulations and investigation guidance documents (e.g., DER-10). NYSDEC and NYSDOH will be contacted to obtain approval for these modifications. All modifications will be reflected in the Remedial Investigation Report (RIR).

The field investigation will be completed in accordance with the procedures specified in Langan's Health and Safety Plan (HASP), Community Air Monitoring Plan (CAMP), and Quality Assurance Project Plan (QAPP) provided in Appendices B, C, and D respectively. A CAMP will be implemented during this investigation (see Section 3.6.2 and Section 8 of the HASP).

Names, contact information, and roles of the principal personnel who will participate in the investigation are listed below. Résumés for each Langan employee are provided in the QAPP (Appendix D).

Personnel	Investigation Role	Contact Information
Jorge Madruga 8th Regiment Partners LLC	Applicant	Email: jorge@madddequities.com

Personnel	Investigation Role	Contact Information
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Tony Moffa, CHMM, COSS, CSP Langan	Langan Health & Safety Officer	Phone – 215-491-6500 Email – tmoffa@langan.com
William Bohrer, PG Langan	Field Safety Officer	Phone – 410-984-3068 Email – wbohrer@langan.com
Connor Moore Langan	Field Team Leader	Phone – 212-479-5512 Email – cmoore@langan.com
Joe Conboy Langan	Data Validator/Program Quality Assurance Monitor	Phone – 602-790-6052 Email – jconboy@langan.com

3.1. Geophysical Survey

A geophysical contractor will conduct a survey in accessible areas of the site to clear boring locations and identify potential subsurface utilities and structures, including USTs, prior to commencing subsurface work. The geophysical survey may be completed using a range of geophysical instruments, including electromagnetic and utility line locator instruments, and ground-penetrating radar. The results of the survey may require relocation of borings.

3.2 Soil Investigation

3.2.1 Soil Sampling and Analysis

An environmental drilling subcontractor will advance 25 soil borings throughout the site to about 35 feet bgs (about 23 feet below basement grade) with a track-mounted Geoprobe and/or Sonic drill rig. Additionally, up to 51 delineation soil borings will be advanced to about 4 feet below basement grade throughout the former rifle and pistol ranges for vertical and horizontal delineation.

Proposed soil boring locations are shown on Figures 5A and 5B, and a summary of the proposed laboratory analyses for each sample is included as Table 1. The following table indicates which borings are associated with each AOC and the rationale for each boring.

AOC	Associated Soil Boring(s)	Rationale
AOC 1	SB01 through SB25	Investigate non-native fill/soil quality

AOC	Associated Soil Boring(s)	Rationale
AOC 2	LB01 through LB42 and step outs to the north, east, south, and west	Delineate hazardous lead impacts in the former rifle and pistol ranges observed during the 2007 and 2013 investigations
AOC 3	SB01, SB02, SB03, SB04, SB05, SB06, SB07, SB08, SB09, SB11, SB16, SB17, SB18, SB19, SB20, SB22, SB23	Investigate petroleum-related VOCs
AOC 4	SB22	Investigate CVOCs

A Langan engineer, geologist, or scientist will document the work, screen the soil samples for environmental impacts, and collect environmental samples for laboratory analyses under the direct supervision of a QEP. Soil will be screened continuously to the boring termination depth for total VOCs concentration using a PID equipped with a 10.6 electron volt (eV) bulb, and for visual and olfactory indications of environmental impacts (e.g., staining, odor). Soil descriptions will be recorded in boring logs.

Up to three samples will be collected for each of the 25 soil borings, plus QA/QC samples, for laboratory analysis from the following depth intervals:

- Shallow fill/soil from within the top two feet of recovery
- Terminus of fill or at the groundwater interface (whichever is shallower).
- Additional samples may be collected as follows:
    - Soil that exhibits evidence of a chemical or petroleum release (if observed); and
    - Clean interval below observed impacts (if observed);

Up to four samples will be collected from each of the 63 delineation borings from the 0 to 1-foot, 1- to 2-foot, 2- to 3-foot, and 3- to 4-foot depth intervals. Samples will be analyzed sequentially, with the shallowest and those collected nearest to the original borings exhibiting characteristics of hazardous lead analyzed first. If sample results indicate a hazardous lead concentration, the next corresponding step-out and/or depth sample will be analyzed.

Non-disposable, down-hole drilling equipment and sampling apparatus will be decontaminated between locations with Alconox® (or similar) and water. Water used for decontamination and rinsate will be containerized into United Nations/Department of Transportation (UN/DOT)-

approved 55-gallon drums, labeled, and staged for off-site disposal. Following sampling, each soil boring will be backfilled with soil cuttings that are not grossly impacted and/or clean sand.

The samples will be collected in laboratory-supplied containers and will be sealed, labeled, and placed in an ice-chilled cooler (to attempt to maintain a temperature of about 4°C) for delivery to a NYSDOH Environmental Laboratory Approval Program (ELAP)-certified laboratory. Soil samples will be analyzed for one or more of the following parameters:

- Part 375 List and Target Compound List (TCL) VOCs (United States Environmental Protection Agency [USEPA] Method 8260C);
- Part 375 List and TCL SVOCs, including 1,4-dioxane (USEPA Method 8270D and/or 8270 SIM);
- Part 375 List polychlorinated biphenyls (PCBs) (USEPA Method 8082A);
- Part 375 List and TCL Pesticides (USEPA Method 8081B);
- Part 375 List and TCL Herbicides (USEPA Method 8151A);
- Target Analyte List (TAL)/Part 375 List metals, including hexavalent and trivalent chromium and total cyanide (USEPA Methods 6010D, 7471B, 7196A, and 9010C/9012B, respectively);
- NYSDEC List PFAS (USEPA Method 1633A); and
- Total and TCLP lead (delineation samples only)

QA/QC procedures to be followed are described in the QAPP in Appendix D. Proposed soil samples and rationale are summarized in Table 1.

3.3 Groundwater Investigation

3.3.1 Monitoring Well Installation

Ten (10) of the soil borings will be converted into groundwater monitoring wells. Figure 5C shows proposed monitoring well locations providing general coverage across the site, subject to revision pending soil boring findings (e.g., petroleum-like impacts). Monitoring wells will be installed in accordance with NYSDEC guidance, with a nominal 2-inch inside diameter well installed within a minimum 6-inch diameter borehole to provide a minimum 2-inch annular space around the well casing.

Following installation, the monitoring wells will be developed using a surge block across the well screen to agitate and remove fines. The surge block will be moved within the well screen in 2- to 3-foot increments for approximately 2 minutes per increment. After surging, the well will be

purged via pumping until the water becomes clear (having turbidity less than 50 Nephelometric Turbidity Units [NTU]). The wells will then be allowed to sit for a minimum of one week prior to collecting groundwater samples. Prior to development, the wells will be gauged for depth to water and light non-aqueous phase liquids (LNAPL).

3.3.2 Monitoring Well Survey

The elevation of the groundwater monitoring wells (top of casing elevations) and horizontal positions will be surveyed. This data will be used with synoptic groundwater well gauging data to prepare a groundwater contour map to evaluate the direction of groundwater flow. Vertical control will be established by surveying relative to the North American Vertical Datum of 1988 (NAVD88), and horizontal positions will be surveyed relative to North American Datum of 1983 (NAD83) by a NYS-licensed land surveyor. Elevations of the top of monitoring well casings and protective well casings will be surveyed to the nearest 0.01 foot.

3.3.3 Groundwater Sampling and Analysis

At least one week after well development, one groundwater sample will be collected from each monitoring well. Prior to groundwater sampling, a complete round of synoptic water level measurements will be collected using an electronic oil-water interface probe, and each monitoring well will be purged. Purging will consist of pumping, at a minimum, the stabilized drawdown volume plus the pump's tubing volume, and waiting until the physical and chemical parameters (e.g., temperature, dissolved oxygen, oxygen reduction potential, turbidity) stabilize within the ranges specified in the USEPA's Low Stress Purging and Sampling Procedure for the Collection of Groundwater Samples From Monitoring Wells, dated July 30, 1996, and 4th revision September 19, 2017, unless otherwise specified by the Langan project manager. Samples will be collected with a peristaltic pump and dedicated polyethylene tubing. Development and purge water will be containerized for off-site disposal.

The groundwater samples will be collected in laboratory-supplied containers and will be sealed, labeled, and placed in an ice-chilled cooler (to maintain a temperature of about 4°C) for delivery to the laboratory. The samples will be analyzed for the following parameters:

- TCL VOCs (USEPA 8260C)
- TCL SVOCs (USEPA 8270D)
- PCBs (USEPA 8082A)
- Part 375 List and TCL pesticides (USEPA 8081B)
- Part 375 List and TCL herbicides (USEPA 8151A)

- Filtered and unfiltered metals (including hexavalent and trivalent chromium, dissolved-phase only) (USEPA Methods 6020B, 7470A, 7196A, and 9010C/9012B, respectively)
- NYSDEC List PFAS (USEPA method 1633A)
- 1,4-dioxane (USEPA Method 8270 SIM)

QA/QC procedures to be followed are described in the QAPP in Appendix D. Proposed groundwater samples and rationale are summarized in Table 2.

3.4 Soil Vapor Investigation

3.4.1 Soil Vapor Sampling and Analysis

A soil vapor intrusion evaluation will be completed in accordance with the Guidance for Evaluating Soil Vapor Intrusion in the State of New York (NYSDOH October 2006, with updates). This evaluation will include sub-slab soil vapor samples, sub-surface soil vapor samples, indoor air samples, and an outdoor ambient air sample, for which proposed locations are shown on Figure 5D.

Prior to collecting samples, an Indoor Air Quality Questionnaire and Building Inventory from (Appendix B in the NYSDOH 2006) will be completed to identify potential sources of interference. Products will be removed/isolated, or samples will be relocated as necessary in an effort to avoid interference from products stored within the building.

Four temporary soil vapor implants will be set at outdoor locations about 5 feet bgs or 2 feet above groundwater, whichever is shallower, with direct push or sonic technology. Clean No. 2 sand will be placed in the annulus around the implant and tubing and the surface sealed with hydrated bentonite. Thirteen (13) temporary sub-slab soil vapor samples will be installed immediately below the bottom of the basement slab using a hammer drill. Each sub-slab soil vapor location will consist of dedicated polyethylene tubing and sealed at grade with hydrated bentonite.

Six of the 13 sub-slab samples will be paired with co-located indoor air samples. Indoor air samples will be collected about 3 feet above the floor to be representative of the breathing zone. An outdoor ambient air sample will also be collected from about 3 feet above the ground.

Prior to vapor sampling, a tracer gas will be used in accordance with NYSDOH protocols to serve as a QA/QC device to verify the integrity of bentonite seals on sub-slab and sub-surface soil vapor samples. A container (box, plastic pail, etc.) will serve to keep the tracer gas in contact with the probe during testing. A portable monitoring device will be used to analyze a sample of soil vapor

for the tracer gas prior to sampling. If the tracer sample results show a significant presence of the tracer, the probe seals will be adjusted to prevent infiltration.

Prior to sampling, a minimum of three tubing volumes will be purged from each sub-slab sample location and soil vapor point. Soil vapor, sub-slab, indoor, and ambient air samples will be collected into individually certified clean 2.7-liter Summa® canisters with flow controllers calibrated for a 8-hour sample interval and analyzed for VOCs using USEPA Method TO-15. Flow rate for both purging and sampling will not exceed 0.2 L/min. At the conclusion of the sampling round, tracer monitoring will be performed a second time to confirm the integrity of the probe seals.

A sample log sheet will be maintained summarizing sample identification, date and time of sample collection, sampling depth, identity of samplers, sampling methods and devices, soil vapor purge volumes, volume of the soil vapor extracted, vacuum of canisters before and after the samples are collected, apparent moisture content of the sampling zone, and chain of custody protocols. Proposed soil vapor sample locations and rationale are summarized in Table 3.

3.5 Data Management and Validation

Laboratory analyses of soil, groundwater, soil vapor, and air samples will be conducted by a NYSDOH ELAP-approved laboratory in accordance with USEPA SW-846 methods and presented in accordance with NYSDEC Analytical Services Protocol (ASP) Category B deliverable format. Environmental data will be reported electronically using the database software application Environmental Quality Information System (EQuIS) as part of NYSDEC's Environmental Information Management System (EIMS).

QA/QC procedures required by the NYSDEC ASP and SW-846 methods, including initial and continuing instrument calibrations, standard compound spikes, surrogate compound spikes, and analysis of other samples (blanks, laboratory control samples, and matrix spikes/matrix spike duplicates), will be followed. The laboratory will provide sample bottles, which will be pre-cleaned and preserved in accordance with the SW-846 methods. Where there are differences in the SW-846 and NYSDEC ASP requirements, the NYSDEC ASP shall take precedence.

Data validation will be performed in accordance with the USEPA validation guidelines for organic and inorganic data review. Validation will include the following:

- Verification of QC sample results (both qualitative and quantitative)
- Verification of sample results (both positive hits and non-detects)
- Preparation of Data Usability Summary Reports (DUSR)

The DUSRs will be prepared and reviewed by the Program Quality Assurance Monitor (PQAM). The DUSRs will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and COC procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method. A detailed assessment of each sample delivery group (SDG) will follow. Additional details on the DUSRs are provided in the QAPP in Appendix D.

3.6 Management of Investigation-Derived Waste

Soil cuttings will be returned to the borehole unless:

- Free product, soil that is noticeably stained or odorous or with PID response greater than background is present in the cuttings;
- Backfilling the borehole with cuttings will create a significant path for vertical movement of contaminants. Soil additives (bentonite) may be added to the cuttings to reduce permeability; or
- The soil cannot fit into the borehole.

Boreholes requiring disposal of drill cuttings will be filled with hydrated bentonite chips or clean sand and capped with asphalt or concrete. Excess investigation-derived waste (IDW), including soil cuttings, purged groundwater, and decontamination fluids, will be containerized in properly-labeled and sealed UN/DOT-approved 55-gallon drums and staged for future waste characterization and off-site disposal at a facility permitted to accept the waste. The drums will be staged in an area on-site, pending receipt of laboratory data and off-site disposal to an appropriate facility. Management of IDW will comply with NYSDEC DER-10 3.3(e).

3.7 Air Monitoring

Air monitoring will be conducted for site workers and the community. Air monitoring results will be recorded in the field book during the investigation activities, downloaded from field instruments and summarized in daily reports.

3.7.1 Worker Air Monitoring

Air monitoring of the breathing zone will be performed periodically during drilling and sampling activities to document health and safety protection for the work team. Langan will monitor VOCs with a PID in accordance with the HASP (Appendix B). If air monitoring during intrusive operations identifies the presence of VOCs, the field engineer will follow the guidelines outlined in the HASP regarding action levels, permissible exposure, engineering controls, and personal protective equipment. If the VOC action level is exceeded, work will cease and the work location will be evacuated. Monitoring will continue until the levels drops to permissible limits, at which point, work will resume with continued monitoring. If high levels persist, field activities will be halted

and the work relocated to another area. If dust emissions are observed, work will stop and dust suppression measures (i.e., water spray) will be implemented.

3.7.2 Community Air Monitoring Plan

In addition to air monitoring in the worker breathing zone, community air monitoring will be performed in compliance with the NYSDOH Generic CAMP (provided as Appendix C) during ground intrusive work and soil handling. CAMP deployment will comply with NYSDEC DER-10 Appendix 1A and Appendix 1B.

CAMP will consist of continuous monitoring for VOCs and dust emissions during ground-intrusive activities (i.e., soil boring and monitoring well installation). Two units will be deployed in the upwind and downwind directions. The locations of these CAMP stations will be determined each day in the field based on the prevailing wind direction. Upwind concentrations will be measured at the start of each workday, and periodically thereafter, to establish background concentrations. VOCs and dust emissions will be monitored at the downwind perimeter of the work zone, which will be established at a point on the site where the general public or site employees may be present. VOC Monitoring will be conducted with a PID equipped with a 10.6 eV lamp. Dust emissions will be monitored using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM10) and capable of averaging a period of 15 minutes (or less) for comparison to the airborne particulate action level (e.g., DustTrak). If dust emissions are observed, work will stop and dust suppression measures will be used. The results will be presented in the daily reports (see DER-10 for details).

3.8 Qualitative Human Health Exposure Assessment

A Qualitative Human Health Exposure Assessment will be conducted in accordance with Appendix 3B of the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation. The assessment will be submitted in the RIR.

3.9 Fish and Wildlife Resources Impact Analysis

Although it is not anticipated, a Fish and Wildlife Resources Impact Analysis (FWRIA) will be conducted, if necessary, in accordance with Section 3.10 and Appendix 3C of the NYSDEC DER-10, Technical Guidance for Site Investigation and Remediation. The assessment will be submitted in the RIR.

4.0 REPORTING

4.1 Daily Field Reports

Daily reports will be prepared and submitted to the NYSDEC project manager by the end of each day following the reporting period and will include:

- Progress updates
- Photographic documentation
- Identification of samples collected
- Locations and references to a site map for completed activities
- A summary of any and all community complaints with relevant details, including contact information
- A summary of CAMP findings, including elevated concentrations and response actions, if any
- An explanation of notable site conditions
- A list of anticipated work for the following reporting day

Daily reports are not intended to notify the NYSDEC of emergencies (e.g., accident, spill), request changes to the RIWP, or communicate other sensitive or time-critical information. However, such conditions will also be included in the daily reports. Emergency conditions and changes to the RIWP will be communicated directly to the NYSDEC Project Manager.

4.2 Remedial Investigation Report

Following completion of the RI and receipt of analytical data, an RIR will be prepared in accordance with the applicable requirements of DER-10 Section 3.14. The report will:

- Describe site history and previous investigations
- Describe site environmental conditions
- Describe sampling methodology and field observations
- Evaluate analytical results and describe findings
- Provide conclusions and recommendations for any further assessment (if warranted)

The report will summarize the nature and extent of contamination and identify unacceptable exposure pathways (as determined through a Qualitative Human Health Exposure Assessment). DUSRs will be included in the RIR and electronic data deliverables will be submitted to the NYSDEC EQuIS database prior to submission of the draft RIR.

DRAFT

The report will include soil borings, monitoring well construction logs, soil vapor logs, and sampling logs, tabulated analytical results, figures, and laboratory data packages. The tabulated analytical results will be organized in table format and include sample location, media sampled, sample depth, field/laboratory identification numbers, analytical results and the applicable Standards, Criteria, and Guidance (SCG) pertaining to the site and contaminants of concern for comparison. The report will include scaled figures showing site stratigraphy and hydrogeology (via cross sections), the locations of soil borings, monitoring wells, soil vapor points, sample concentrations above SCGs for each media, groundwater elevation contours and flow direction, and, if appropriate, groundwater contaminant concentration contours.

The RIR will be provided in an electronic format to the NYSDEC.

DRAFT

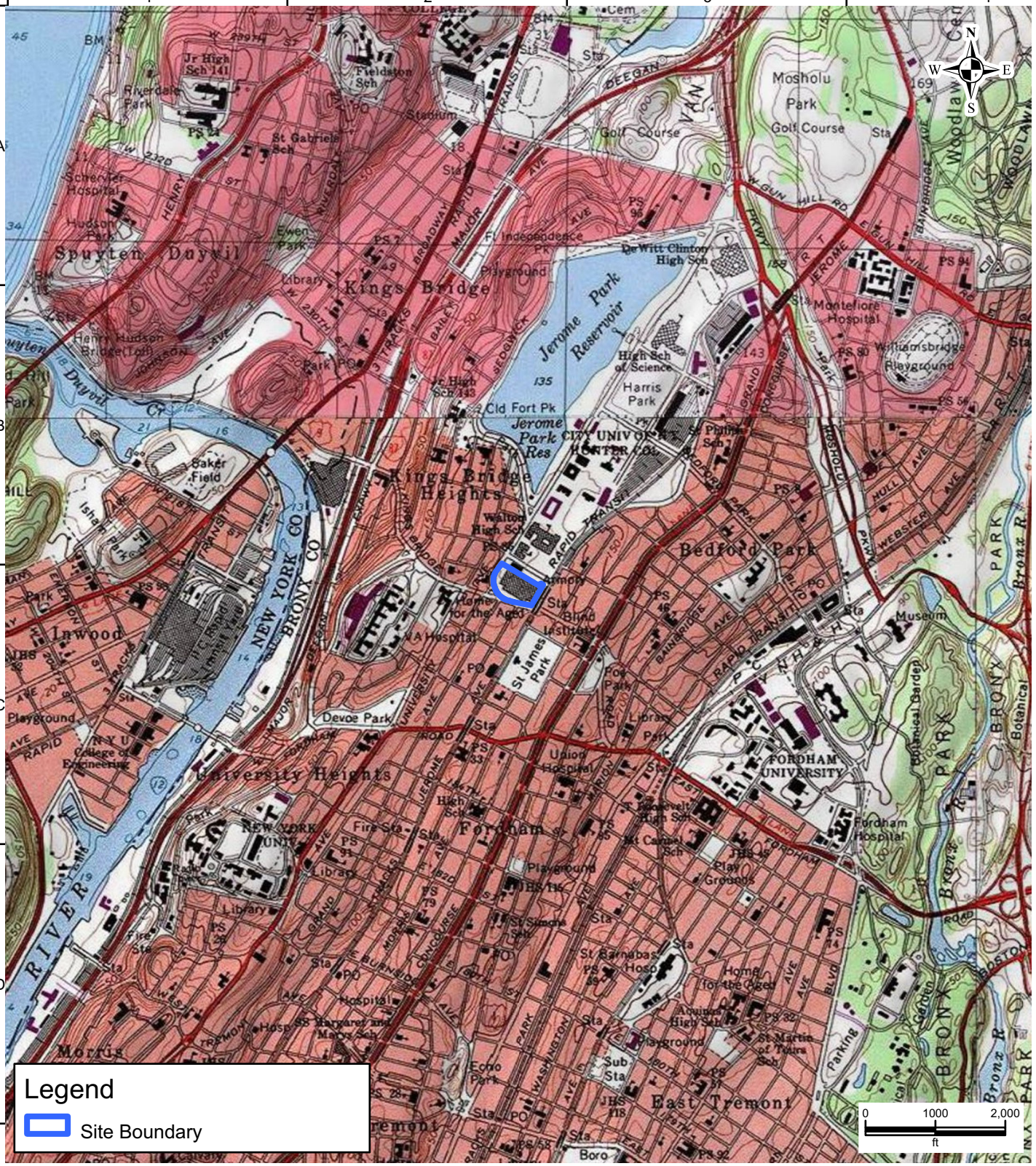
5.0 SCHEDULE

The table below presents an anticipated schedule for the proposed RI and reporting following the approval of the RIWP. If the schedule changes, it will be updated and submitted to the NYSDEC.

Milestone	Weeks from NYSDEC Approval of RIWP	Estimated Duration (weeks)
RI Mobilization	3	2
RI Field Investigation	5	4
Laboratory Analysis	9	3
Data Validation	12	3
Remedial Investigation Report Preparation and Submission to the NYSDEC	15	4

DRAFT

FIGURES



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Project
BRONX
KINGSBRIDGE
ARMORY SITE
BLOCK No. 3247, LOT No. 10
BRONX NEW YORK

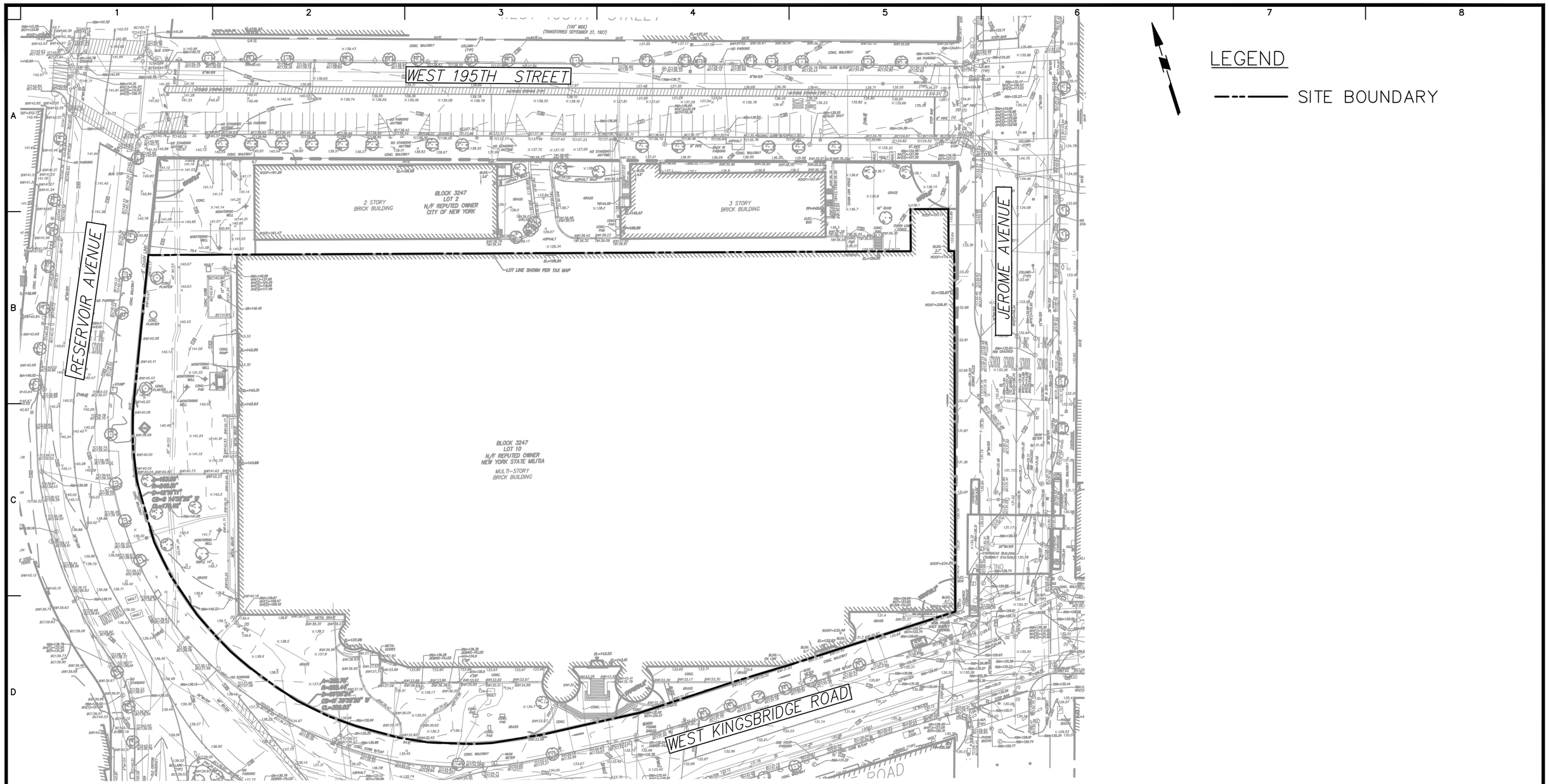
Figure Title
SITE LOCATION MAP

Project No.	170900201
Date	5/19/2026
Scale	1 inch = 2,000 feet
Drawn By	Site Analyzer
Submission Date	5/19/2026

Figure 1

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Project

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BRONX NEW YORK

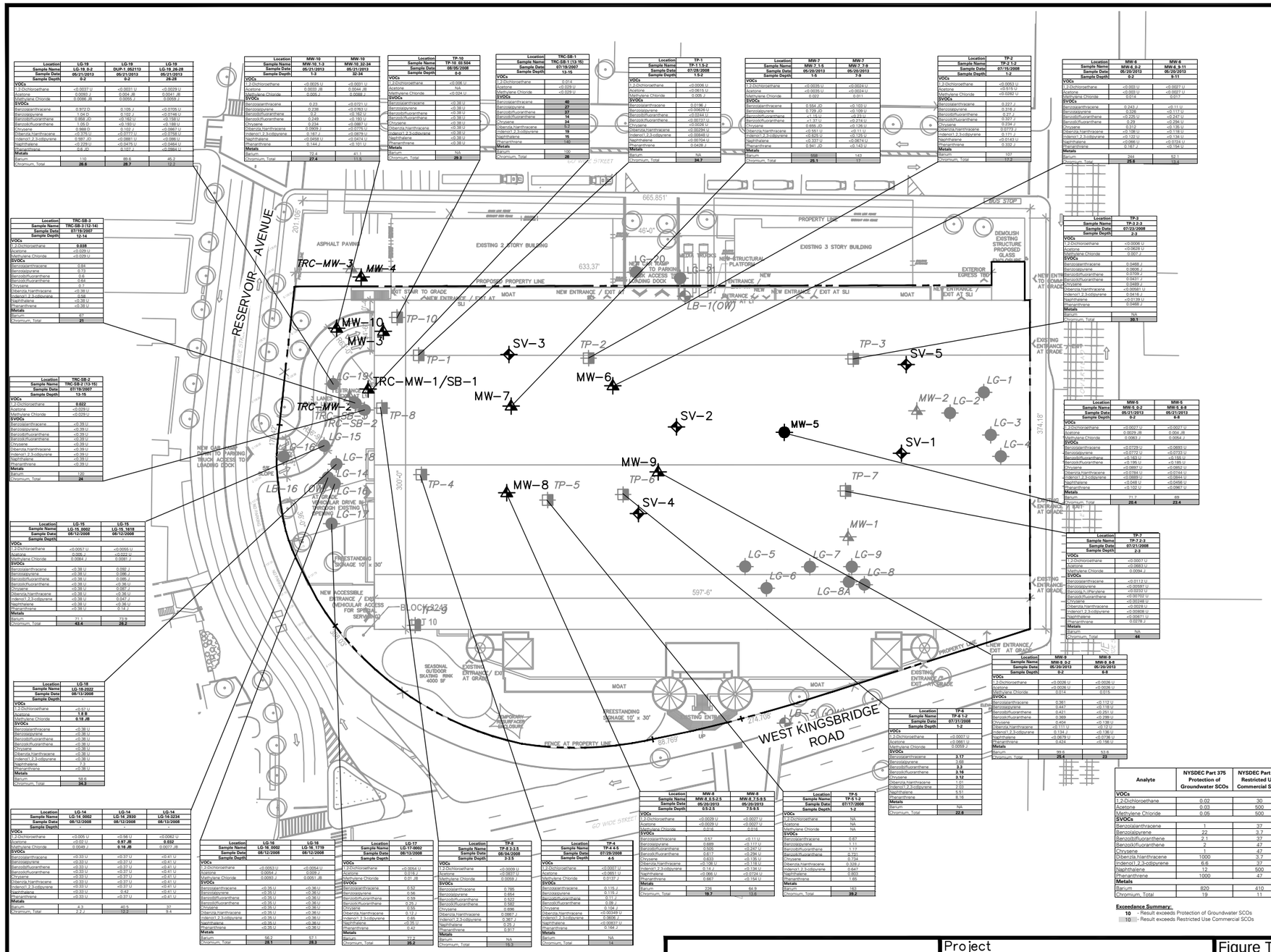
Figure Title

SITE PLAN

Project No. 170900201	Figure No. 2
Date 3/4/2026	
Scale 1" = 80'	
Drawn By FB	
Submission Date	

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Filename: \\langan.com\data\NYC\data2\170900201\Project Data\CAD-PW\01\SheetFiles\RIWP Figures\Figure 2 - Site Plan.dwg Date: 6/4/2026 Time: 12:25 User: kwexler Style Table: ---- Layout: ANSIB-BL



Location	LG-19	LG-19	LG-19
Sample Name	LG-19_0-2	DUP-1_052113	LG-19_26-28
Sample Date	05/21/2013	05/21/2013	05/21/2013
Sample Depth	0-2	0-2	26-28
VOCs			
1,2-Dichloroethane	<0.0037 U	<0.0031 U	<0.0029 U
Acetone	0.0093 J	0.004 JB	0.0041 JB
Methylene Chloride	0.0066 JB	0.0055 J	0.0059 J
SVOCs			
Benzo(a)anthracene	0.972 D	0.126 J	<0.0705 U
Benzo(a)pyrene	1.04 D	0.102 J	<0.0748 U
Benzo(b)fluoranthene	0.858 JD	<0.182 U	<0.156 U
Benzo(k)fluoranthene	1.05 D	<0.193 U	<0.188 U
Chrysene	0.869 D	0.102 J	<0.0867 U
Dibenz(a,h)anthracene	<0.375 U	<0.0777 U	<0.0758 U
Indeno(1,2,3-cd)pyrene	0.597 JD	<0.0881 U	<0.0986 U
Naphthalene	<0.229 U	<0.0475 U	<0.0464 U
Phenanthrene	0.6 JD	0.107 J	<0.0884 U
Metals			
Barium	110	89.6	45.2
Chromium, Total	**26.0**	**28.7**	12.2

Location	MW-10	MW-10
Sample Name	MW-10_1-3	MW-10_32-34
Sample Date	05/21/2013	05/21/2013
Sample Depth	1-3	32-34
VOCs		
1,2-Dichloroethane	<0.0028 U	<0.0031 U
Acetone	0.0033 JB	0.0044 JB
Methylene Chloride	0.005 J	0.0088 J
SVOCs		
Benzo(a)anthracene	0.23	<0.0721 U
Benzo(a)pyrene	0.238	<0.0763 U
Benzo(b)fluoranthene	0.2	<0.182 U
Benzo(k)fluoranthene	0.249	<0.193 U
Chrysene	0.234	<0.0887 U
Dibenz(a,h)anthracene	0.0909 J	<0.0775 U
Indeno(1,2,3-cd)pyrene	0.187 J	<0.0879 U
Naphthalene	<0.0509 U	<0.0475 U
Phenanthrene	0.144 J	<0.101 U
Metals		
Barium	77.4	41.1
Chromium, Total	**27.4**	11.6

Location	TP-10	
Sample Name	TP-10 02.5O4	
Sample Date	08/05/2008	
Sample Depth	0-0	
VOCs		
1,2-Dichloroethane	<0.008 U	
Acetone	NA	
Methylene Chloride	<0.024 U	
SVOCs		
Benzo(a)anthracene	<0.38 U	
Benzo(a)pyrene	<0.38 U	
Benzo(b)fluoranthene	<0.38 U	
Benzo(k)fluoranthene	<0.38 U	
Chrysene	<0.38 U	
Dibenz(a,h)anthracene	<0.38 U	
Indeno(1,2,3-cd)pyrene	<0.38 U	
Naphthalene	<0.38 U	
Phenanthrene	<0.38 U	
Metals		
Barium	NA	
Chromium, Total	**29.3**	

Location	TRC-SB-1	
Sample Name	TRC-SB-1 (13-15)	
Sample Date	07/19/2007	
Sample Depth	13-15	
VOCs		
1,2-Dichloroethane	0.004	
Acetone	<0.029 U	
Methylene Chloride	<0.029 U	
SVOCs		
Benzo(a)anthracene	**40**	
Benzo(a)pyrene	**27**	
Benzo(b)fluoranthene	**37**	
Benzo(k)fluoranthene	**14**	
Chrysene	**34**	
Dibenz(a,h)anthracene	**5.3**	
Indeno(1,2,3-cd)pyrene	**19**	
Naphthalene	**15**	
Phenanthrene	**140**	
Metals		
Barium	100	
Chromium, Total	**26**	

Location	TP-1	
Sample Name	TP-1 1.5-2	
Sample Date	07/28/2008	
Sample Depth	1.5-2	
VOCs		
1,2-Dichloroethane	<0.0006 U	
Acetone	<0.0615 U	
Methylene Chloride	0.005 J	
SVOCs		
Benzo(a)anthracene	0.0196 J	
Benzo(a)pyrene	<0.00626 U	
Benzo(b)fluoranthene	<0.0243 U	
Benzo(k)fluoranthene	<0.00727 U	
Chrysene	<0.00226 U	
Dibenz(a,h)anthracene	<0.00284 U	
Indeno(1,2,3-cd)pyrene	<0.00348 U	
Naphthalene	<0.00704 U	
Phenanthrene	0.0439 J	
Metals		
Barium	NA	
Chromium, Total	**34.7**	

Location	MW-7	MW-7
Sample Name	MW-7_1-5	MW-7_7-9
Sample Date	05/29/2013	05/30/2013
Sample Depth	1-5	7-9
VOCs		
1,2-Dichloroethane	<0.0035 U	<0.0024 U
Acetone	<0.0035 U	<0.0024 U
Methylene Chloride	0.022	0.011
SVOCs		
Benzo(a)anthracene	0.584 JD	<0.103 U
Benzo(a)pyrene	0.728 JD	<0.109 U
Benzo(b)fluoranthene	<1.15 U	<0.23 U
Benzo(k)fluoranthene	<1.17 U	<0.274 U
Chrysene	0.695 JD	<0.126 U
Dibenz(a,h)anthracene	<0.920 U	<0.111 U
Indeno(1,2,3-cd)pyrene	<0.926 U	<0.125 U
Naphthalene	<0.337 U	<0.0674 U
Phenanthrene	0.841 JD	<0.143 U
Metals		
Barium	568	143
Chromium, Total	**25.1**	17

Location	TP-2	
Sample Name	TP-2 1-2	
Sample Date	07/15/2008	
Sample Depth	1-2	
VOCs		
1,2-Dichloroethane	<0.0063 U	
Acetone	<0.515 U	
Methylene Chloride	<0.0292 U	
SVOCs		
Benzo(a)anthracene	0.227 J	
Benzo(a)pyrene	0.318 J	
Benzo(b)fluoranthene	0.27 J	
Benzo(k)fluoranthene	0.337 J	
Chrysene	0.234 J	
Dibenz(a,h)anthracene	0.0772 J	
Indeno(1,2,3-cd)pyrene	0.171 J	
Naphthalene	<0.0143 U	
Phenanthrene	0.332 J	
Metals		
Barium	107	
Chromium, Total	**17.2**	

Location	MW-6	MW-6
Sample Name	MW-6_0-2	MW-6_9-11
Sample Date	05/30/2013	05/30/2013
Sample Depth	0-2	9-11
VOCs		
1,2-Dichloroethane	<0.003 U	<0.0027 U
Acetone	<0.003 U	<0.0027 U
Methylene Chloride	0.014	0.011
SVOCs		
Benzo(a)anthracene	0.243 J	<0.111 U
Benzo(a)pyrene	0.326	<0.111 U
Benzo(b)fluoranthene	<0.225 U	<0.247 U
Benzo(k)fluoranthene	0.29	<0.294 U
Chrysene	0.312	<0.135 U
Dibenz(a,h)anthracene	<0.108 U	<0.119 U
Indeno(1,2,3-cd)pyrene	<0.122 U	<0.134 U
Naphthalene	<0.0656 U	<0.0724 U
Phenanthrene	0.167 J	<0.154 U
Metals		
Barium	244	52.1
Chromium, Total	**26.6**	13.6

Location	TP-3	
Sample Name	TP-3 2-3	
Sample Date	07/23/2008	
Sample Depth	2-3	
VOCs		
1,2-Dichloroethane	<0.0006 U	
Acetone	<0.0628 U	
Methylene Chloride	0.0077 J	
SVOCs		
Benzo(a)anthracene	0.0488 J	
Benzo(a)pyrene	0.0606 J	
Benzo(b)fluoranthene	0.0728 J	
Benzo(k)fluoranthene	0.0431 J	
Chrysene	0.0488 J	
Dibenz(a,h)anthracene	<0.00581 U	
Indeno(1,2,3-cd)pyrene	0.0414 J	
Naphthalene	<0.0139 U	
Phenanthrene	0.0468 J	
Metals		
Barium	NA	
Chromium, Total	**30.1**	

Location	MW-5	MW-5
Sample Name	MW-5_0-2	MW-5_6-8
Sample Date	05/21/2013	05/21/2013
Sample Depth	0-2	6-8
VOCs		
1,2-Dichloroethane	<0.0027 U	<0.0027 U
Acetone	0.0029 JB	0.004 JB
Methylene Chloride	0.0063 J	0.0064 J
SVOCs		
Benzo(a)anthracene	<0.0729 U	<0.0693 U
Benzo(a)pyrene	<0.0772 U	<0.0719 U
Benzo(b)fluoranthene	<0.183 U	<0.185 U
Benzo(k)fluoranthene	<0.195 U	<0.189 U
Chrysene	<0.0897 U	<0.0852 U
Dibenz(a,h)anthracene	<0.0284 U	<0.0744 U
Indeno(1,2,3-cd)pyrene	<0.0888 U	<0.0844 U
Naphthalene	<0.048 U	<0.0458 U
Phenanthrene	<0.102 U	<0.0967 U
Metals		
Barium	71.1	69
Chromium, Total	**20.4**	**23.4**

Location	TP-7	
Sample Name	TP-7 2-3	
Sample Date	07/21/2008	
Sample Depth	2-3	
VOCs		
1,2-Dichloroethane	<0.0007 U	
Acetone	<0.0663 U	
Methylene Chloride	0.0094 J	
SVOCs		
Benzo(a)anthracene	<0.0137 U	
Benzo(a)pyrene	<0.00597 U	
Benzo(b,k)fluoranthene	<0.00737 U	
Chrysene	<0.00702 U	
Dibenz(a,h)anthracene	<0.00228 U	
Indeno(1,2,3-cd)pyrene	<0.00698 U	
Naphthalene	<0.00671 U	
Phenanthrene	0.02378 J	
Metals		
Barium	NA	
Chromium, Total	**44**	

Location	MW-9	MW-9
Sample Name	MW-9_0-2	MW-9_6-8
Sample Date	06/20/2013	06/20/2013
Sample Depth	0-2	6-8
VOCs		
1,2-Dichloroethane	<0.0038 U	<0.0026 U
Acetone	<0.0036 U	<0.0036 U
Methylene Chloride	0.0114	0.013
SVOCs		
Benzo(a)anthracene	0.361	<0.122 U
Benzo(a)pyrene	0.447	<0.118 U
Benzo(b)fluoranthene	0.431	<0.251 U
Benzo(k)fluoranthene	0.369	<0.299 U
Chrysene	0.404	<0.138 U
Dibenz(a,h)anthracene	<0.131 U	<0.12 U
Indeno(1,2,3-cd)pyrene	0.134 J	<0.136 U
Naphthalene	<0.0679 U	<0.0739 U
Phenanthrene	0.424	<0.156 U
Metals		
Barium	99.6	53.6
Chromium, Total	**25.4**	**23**

Location	TP-8	
Sample Name	TP-8 1-2	
Sample Date	07/31/2008	
Sample Depth	1-2	
VOCs		
1,2-Dichloroethane	<0.0007 U	
Acetone	<0.0661 U	
Methylene Chloride	0.0059 J	
SVOCs		
Benzo(a)anthracene	**3.17**	
Benzo(a)pyrene	3.69	
Benzo(b)fluoranthene	**3.3**	
Benzo(k)fluoranthene	**1.16**	
Chrysene	**3.12**	
Dibenz(a,h)anthracene	1.01	
Indeno(1,2,3-cd)pyrene	2.03	
Naphthalene	5.51	
Phenanthrene	8.16	
Metals		
Barium	NA	
Chromium, Total	**22.6**	

Location	LG-18	
Sample Name	LG-18_0502	
Sample Date	08/13/2008	
Sample Depth	-	
VOCs		
1,2-Dichloroethane	<0.67 U	
Acetone	**1.8 B**	
Methylene Chloride	**0.18 JB**	
SVOCs		
Benzo(a)anthracene	<0.38 U	
Benzo(a)pyrene	<0.38 U	
Benzo(b)fluoranthene	<0.38 U	
Benzo(k)fluoranthene	<0.38 U	
Chrysene	<0.38 U	
Dibenz(a,h)anthracene	<0.38 U	
Indeno(1,2,3-cd)pyrene	<0.38 U	
Naphthalene	<0.38 U	
Phenanthrene	<0.38 U	
Metals		
Barium	56.6	
Chromium, Total	**34.3**	

Location	LG-14	LG-14	LG-14
Sample Name	LG-14_0002	LG-14_2930	LG-14_3234
Sample Date	08/12/2008	08/12/2008	08/13/2008
Sample Depth	-	-	-
VOCs			
1,2-Dichloroethane	<0.005 U	<0.98 U	<0.0082 U
Acetone	<0.03 U	**0.97 JB**	**0.032**
Methylene Chloride	0.0049 J	**0.16 JB**	0.0077 JB
SVOCs			
Benzo(a)anthracene	<0.33 U	<0.37 U	<0.41 U
Benzo(a)pyrene	<0.33 U	<0.37 U	<0.41 U
Benzo(b)fluoranthene	<0.33 U	<0.37 U	<0.41 U
Benzo(k)fluoranthene	<0.33 U	<0.37 U	<0.41 U
Chrysene	<0.33 U	<0.37 U	<0.41 U
Dibenz(a,h)anthracene	<0.33 U	<0.37 U	<0.41 U
Indeno(1,2,3-cd)pyrene	<0.33 U	<0.37 U	<0.41 U
Naphthalene	<0.33 U	0.42	<0.41 U
Phenanthrene	<0.33 U	<0.37 U	<0.41 U
Metals			
Barium	4.3	40.5	37
Chromium, Total	2.2 J	19.2	9.4

Location	LG-16	LG-16
Sample Name	LG-16_0002	LG-16_1719
Sample Date	08/12/2008	08/12/2008
Sample Depth	-	-
VOCs		
1,2-Dichloroethane	<0.0053 U	<0.0054 U
Acetone	0.0054 J	0.009 J
Methylene Chloride	0.0093 J	0.0061 JB
SVOCs		
Benzo(a)anthracene	<0.35 U	<0.36 U
Benzo(a)pyrene	<0.35 U	<0.36 U
Benzo(b)fluoranthene	<0.35 U	<0.36 U
Benzo(k)fluoranthene	<0.35 U	<0.36 U
Chrysene	<0.35 U	<0.36 U
Dibenz(a,h)anthracene	<0.35 U	<0.36 U
Indeno(1,2,3-cd)pyrene	<0.35 U	<0.36 U
Naphthalene	<0.35 U	<0.36 U
Phenanthrene	<0.35 U	<0.36 U
Metals		
Barium	58.2	57.1
Chromium, Total	**28.1**	**28.3**

Location	LG-17	
Sample Name	LG-17-0002	
Sample Date	08/13/2008	
Sample Depth	-	
VOCs		
1,2-Dichloroethane	<0.0054 U	
Acetone	0.018 J	
Methylene Chloride	0.01 JB	
SVOCs		
Benzo(a)anthracene	0.52	
Benzo(a)pyrene	0.56	
Benzo(b)fluoranthene	0.59	
Benzo(k)fluoranthene	0.25 J	
Chrysene	0.56	
Dibenz(a,h)anthracene	0.12 J	
Indeno(1,2,3-cd)pyrene	0.65	
Naphthalene	<0.35 U	
Phenanthrene	0.42	
Metals		
Barium	77.2	
Chromium, Total	**35.2**	

Location	TP-8	
Sample Name	TP-8 2-3.5	
Sample Date	08/04/2008	
Sample Depth	2-3.5	
VOCs		
1,2-Dichloroethane	<0.0009 U	
Acetone	<0.0937 U	
Methylene Chloride	0.0059 J	
SVOCs		
Benzo(a)anthracene	0.785	
Benzo(a)pyrene	0.654	
Benzo(b)fluoranthene	0.922	
Benzo(k)fluoranthene	0.592	
Chrysene	0.896	
Dibenz(a,h)anthracene	0.0967 J	
Indeno(1,2,3-cd)pyrene	0.367 J	
Naphthalene	0.25 J	
Phenanthrene	0.917	
Metals		
Barium	NA	
Chromium, Total	**16.3**	

Location	TP-4	
Sample Name	TP-4 4-5	
Sample Date	07/29/2008	
Sample Depth	4-5	
VOCs		
1,2-Dichloroethane	<0.0007 U	
Acetone	<0.0661 U	
Methylene Chloride	0.0137 J	
SVOCs		
Benzo(a)anthracene	0.176 J	
Benzo(a)pyrene	0.176 J	
Benzo(b)fluoranthene	0.11 J	
Benzo(k)fluoranthene	0.08 J	
Chrysene	0.194 J	
Dibenz(a,h)anthracene	<0.00349 U	
Indeno(1,2,3-cd)pyrene	0.0606 J	
Naphthalene	<0.00937 U	
Phenanthrene	0.164 J	
Metals		
Barium	NA	
Chromium, Total	**14**	

Location	TP-5	
Sample Name	TP-5 1-2	
Sample Date	07/17/2008	
Sample Depth	1-2	
VOCs		
1,2-Dichloroethane	NA	
Acetone	NA	
Methylene Chloride	NA	
SVOCs		
Benzo(a)anthracene	0.67	
Benzo(a)pyrene	1.11	
Benzo(b)fluoranthene	1.17	
Benzo(k)fluoranthene	0.733	
Chrysene	0.734	
Dibenz(a,h)anthracene	0.339 J	
Indeno(1,2,3-cd)pyrene	0.647	
Naphthalene	0.845	
Phenanthrene	1.65	
Metals		
Barium	163	
Chromium, Total	**39.2**	

Analyte	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs
VOCs		
1,2-Dichloroethane	0.02	30
Acetone	0.03	500
Methylene Chloride	0.05	500
SVOCs		
Benzo(a)anthracene	1	37
Benzo(a)pyrene	22	3.7
Benzo(b)fluoranthene	2.1	37
Benzo(k)fluoranthene	2	47
Chrysene	1	47
Dibenz(a,h)anthracene	1000	3.7
Indeno(1,2,3-cd)pyrene	8.6	37
Naphthalene	12	500
Phenanthrene	1000	47
Metals		
Barium	820	410
Chromium, Total	19	11

Exceedance Summary:
- **10** = Result exceeds Protection of Groundwater SCOs
- 10 = Result exceeds Restricted Use Commercial SCOs

LEGEND

- SITE BOUNDARY
- LG–19 — 2013 SOIL BORING LOCATION
- MW–5 — 2013 TEMPORARY MONITORING WELL/SOIL BORING LOCATION
- SV–1 — 2013 SOIL VAPOR SAMPLING POINT
- *LB-1(OW)* — **2008 OBSERVATION WELL**
- *LG-5* — **2008 SOIL BORING**
- *MW-2* — **2007 - 2009 MONITORING WELL**
- *TP-6* — **2008 TEST PIT**

NOTES:

1. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NYSDEC TITLE 6 OF THE OFFICIAL COMPILATION OF NYCRR PART 375 PROTECTION OF GROUNDWATER (PGW) SOIL CLEANUP OBJECTIVES (SCO) AND RESTRICTED USE COMERCIAL SCO.
2. NYSDEC PART 375 PGW SCO EXCEEDANCES ARE BOLDED.
3. NYSDEC PART 375 RESTRICTED USE COMERCIAL SCO EXCEEDANCES ARE HIGHLIGHTED.
4. VOCs = VOLATILE ORGANIC COMPOUNDS
5. SOIL SAMPLE RESULTS ARE DISPLAYED IN UNITS OF MILLIGRAM PER KILOGRAM (mg/kg)
6. U = THE ANALYTE WAS ANALYZED FOR, BUT WAS NOT DETECTED AT A LEVEL. GREATER THAN OR EQUAL TO THE REPORTING LIMIT (RL); THE VALUE SHOWN IN THE TABLE IS THE RL.
7. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL), BUT BELOW THE RL; THEREFORE, THE RESULT IS AN ESTIMATED CONCENTRATION.
8. B = THE ANALYTE WAS FOUND IN THE ASSOCIATED ANALYSIS BATCH BLANK
9. D = THE CONCENTRATION REPORTED IS A RESULT OF A DILUTED SAMPLE
10. DUP-1 (052113) IS A DUPLICATE SAMPLE OF LG-19 (0-2)
11. NA = NOT TESTED
12. BASE MAP IS REFERENCED FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

100 0 50 100
SCALE IN FEET

REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

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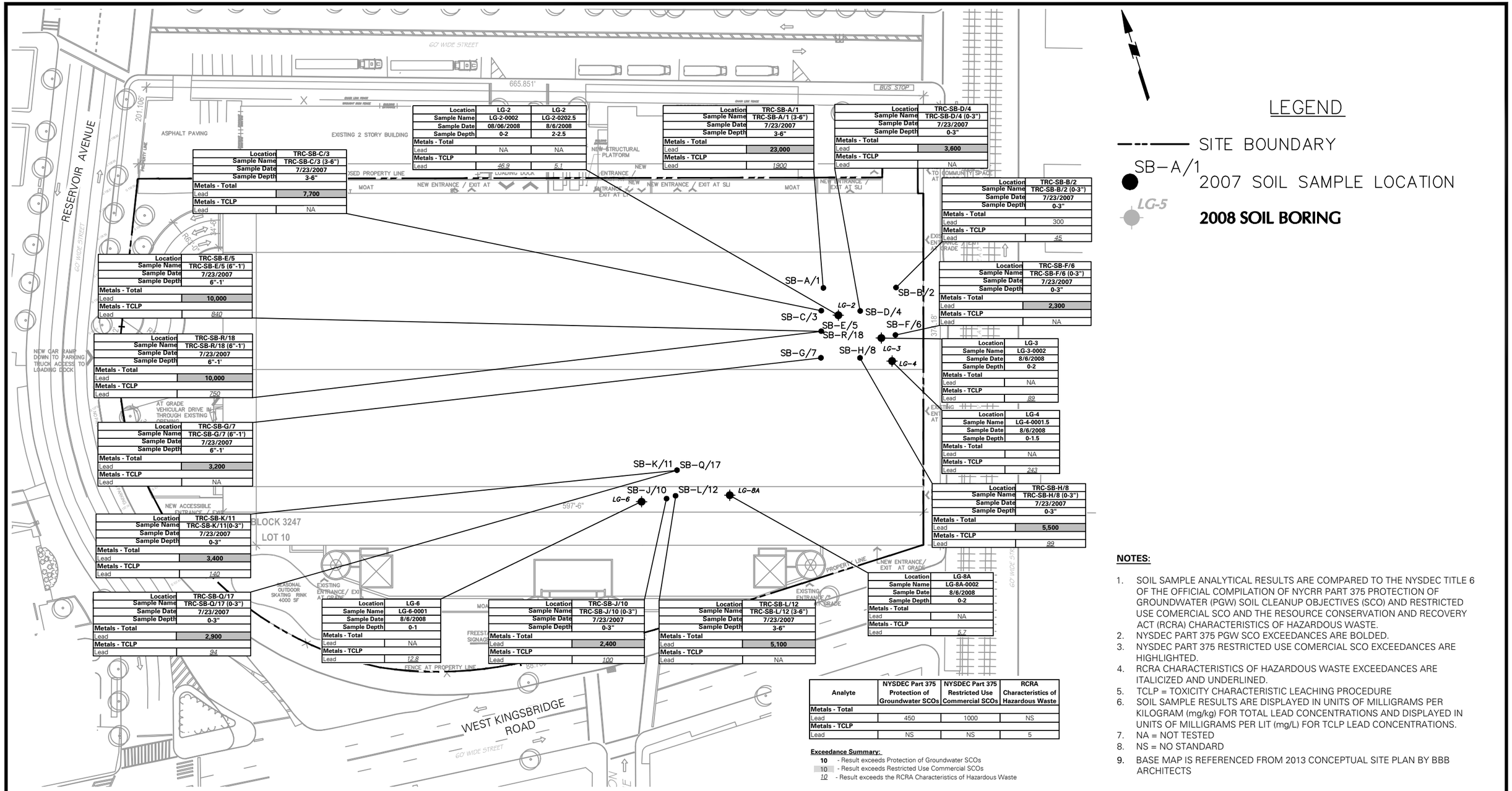
Project
BRONX KINGSBRIDGE ARMORY SITE
BLOCK No. 3247, LOT No. 10
BRONX NEW YORK

Figure Title
PREVIOUS SOIL SAMPLE LOCATION AND ANALYTICAL RESULTS MAP

Project No. 170900201	Figure No. **3A**
Date 3/4/2026	
Scale 1" = 100'	
Drawn By PM	
Submission Date	

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Filename: \\langan.com\data\NYC\data2\170900201\Project Data\CAD-PW\01\SheetFiles\Tags Figures for BCP App\Figure 3A - Soil Sample Locations and Results Map.dwg Date: 3/13/2026 Time: 07:34 User: kwexler Style Table: ---- Layout: ANSIB-BL



Location	LG-2	LG-2
Sample Name	LG-2-0002	LG-2-0202.5
Sample Date	08/06/2008	8/6/2008
Sample Depth	0-2	2-2.5
Metals - Total		
Lead	NA	NA
Metals - TCLP		
Lead	*46.9*	*5.1*

Location	TRC-SB-A/1
Sample Name	TRC-SB-A/1 (3-6")
Sample Date	7/23/2007
Sample Depth	3-6"
Metals - Total	
Lead	**23,000**
Metals - TCLP	
Lead	*1900*

Location	TRC-SB-D/4
Sample Name	TRC-SB-D/4 (0-3")
Sample Date	7/23/2007
Sample Depth	0-3"
Metals - Total	
Lead	**3,600**
Metals - TCLP	
Lead	NA

Location	TRC-SB-C/3
Sample Name	TRC-SB-C/3 (3-6")
Sample Date	7/23/2007
Sample Depth	3-6"
Metals - Total	
Lead	**7,700**
Metals - TCLP	
Lead	NA

Location	TRC-SB-B/2
Sample Name	TRC-SB-B/2 (0-3")
Sample Date	7/23/2007
Sample Depth	0-3"
Metals - Total	
Lead	300
Metals - TCLP	
Lead	*45*

Location	TRC-SB-E/5
Sample Name	TRC-SB-E/5 (6"-1')
Sample Date	7/23/2007
Sample Depth	6"-1'
Metals - Total	
Lead	**10,000**
Metals - TCLP	
Lead	*840*

Location	TRC-SB-F/6
Sample Name	TRC-SB-F/6 (0-3")
Sample Date	7/23/2007
Sample Depth	0-3"
Metals - Total	
Lead	**2,300**
Metals - TCLP	
Lead	NA

Location	TRC-SB-R/18
Sample Name	TRC-SB-R/18 (6"-1')
Sample Date	7/23/2007
Sample Depth	6"-1'
Metals - Total	
Lead	**10,000**
Metals - TCLP	
Lead	*750*

Location	LG-3
Sample Name	LG-3-0002
Sample Date	8/6/2008
Sample Depth	0-2
Metals - Total	
Lead	NA
Metals - TCLP	
Lead	*89*

Location	TRC-SB-G/7
Sample Name	TRC-SB-G/7 (6"-1')
Sample Date	7/23/2007
Sample Depth	6"-1'
Metals - Total	
Lead	**3,200**
Metals - TCLP	
Lead	NA

Location	LG-4
Sample Name	LG-4-0001.5
Sample Date	8/6/2008
Sample Depth	0-1.5
Metals - Total	
Lead	NA
Metals - TCLP	
Lead	*243*

Location	TRC-SB-H/8
Sample Name	TRC-SB-H/8 (0-3")
Sample Date	7/23/2007
Sample Depth	0-3"
Metals - Total	
Lead	**5,500**
Metals - TCLP	
Lead	*99*

Location	TRC-SB-K/11
Sample Name	TRC-SB-K/11(0-3")
Sample Date	7/23/2007
Sample Depth	0-3"
Metals - Total	
Lead	**3,400**
Metals - TCLP	
Lead	*140*

Location	TRC-SB-Q/17
Sample Name	TRC-SB-Q/17 (0-3")
Sample Date	7/23/2007
Sample Depth	0-3"
Metals - Total	
Lead	**2,900**
Metals - TCLP	
Lead	*94*

Location	LG-6
Sample Name	LG-6-0001
Sample Date	8/6/2008
Sample Depth	0-1
Metals - Total	
Lead	NA
Metals - TCLP	
Lead	*12.8*

Location	TRC-SB-J/10
Sample Name	TRC-SB-J/10 (0-3")
Sample Date	7/23/2007
Sample Depth	0-3"
Metals - Total	
Lead	**2,400**
Metals - TCLP	
Lead	*100*

Location	TRC-SB-L/12
Sample Name	TRC-SB-L/12 (3-6")
Sample Date	7/23/2007
Sample Depth	3-6"
Metals - Total	
Lead	**5,100**
Metals - TCLP	
Lead	NA

Location	LG-8A
Sample Name	LG-8A-0002
Sample Date	8/6/2008
Sample Depth	0-2
Metals - Total	
Lead	NA
Metals - TCLP	
Lead	*5.7*

Analyte	NYSDEC Part 375 Protection of Groundwater SCOs	NYSDEC Part 375 Restricted Use Commercial SCOs	RCRA Characteristics of Hazardous Waste
Metals - Total			
Lead	450	1000	NS
Metals - TCLP			
Lead	NS	NS	5

Exceedance Summary:

10 - Result exceeds Protection of Groundwater SCOs

10 - Result exceeds Restricted Use Commercial SCOs

10 - Result exceeds the RCRA Characteristics of Hazardous Waste

LEGEND

SITE BOUNDARY

SB–A/1 2007 SOIL SAMPLE LOCATION

LG-5 **2008 SOIL BORING**

NOTES:

1. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NYSDEC TITLE 6 OF THE OFFICIAL COMPILATION OF NYCRR PART 375 PROTECTION OF GROUNDWATER (PGW) SOIL CLEANUP OBJECTIVES (SCO) AND RESTRICTED USE COMERCIAL SCO AND THE RESOURCE CONSERVATION AND RECOVERY ACT (RCRA) CHARACTERISTICS OF HAZARDOUS WASTE.
2. NYSDEC PART 375 PGW SCO EXCEEDANCES ARE BOLDED.
3. NYSDEC PART 375 RESTRICTED USE COMERCIAL SCO EXCEEDANCES ARE HIGHLIGHTED.
4. RCRA CHARACTERISTICS OF HAZARDOUS WASTE EXCEEDANCES ARE ITALICIZED AND UNDERLINED.
5. TCLP = TOXICITY CHARACTERISTIC LEACHING PROCEDURE
6. SOIL SAMPLE RESULTS ARE DISPLAYED IN UNITS OF MILLIGRAMS PER KILOGRAM (mg/kg) FOR TOTAL LEAD CONCENTRATIONS AND DISPLAYED IN UNITS OF MILLIGRAMS PER LIT (mg/L) FOR TCLP LEAD CONCENTRATIONS.
7. NA = NOT TESTED
8. NS = NO STANDARD
9. BASE MAP IS REFERENCED FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

80 0 40 80

SCALE IN FEET

REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

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Project

BRONX KINGSBRIDGE ARMORY SITE

BLOCK No. 3247, LOT No. 10

BRONX NEW YORK

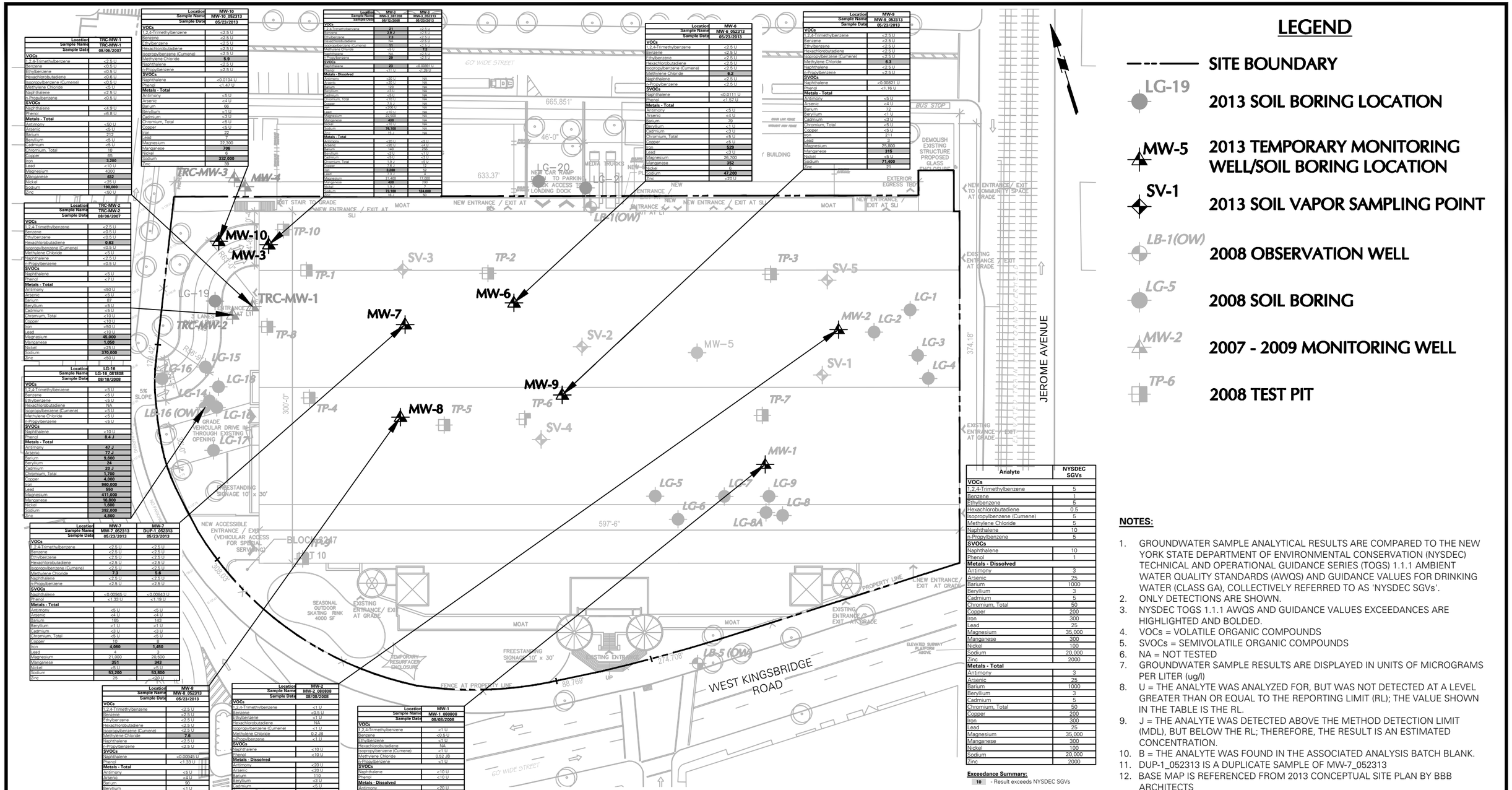
Figure Title

PREVIOUS SOIL SAMPLE LOCATION AND ANALYTICAL RESULTS - TCLP

Project No. 170900201	Figure No. **3B**
Date 3/4/2026	
Scale 1" = 80'	
Drawn By PM	
Submission Date	

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Filename: \\langan.com\data\NYC\data2\170900201\Project Data\CAD-PW\01\SheetFiles\Tags Figures for BCP App\Figure 3b - Soil Sample Locations and Results Map - Total & TCLP Lead_recover.dwg Date: 3/13/2026 Time: 09:37 User: kwexler Style Table: ----
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Location	TRC-MW-1
Sample Name	TRC-MW-1
Sample Date	08/06/2007
VOCs	
1,2,4-Trimethylbenzene	<2.5 U
Benzene	<0.5 U
Ethylbenzene	<0.5 U
Hexachlorobutadiene	<0.5 U
Isopropylbenzene (Cumene)	<0.5 U
Methylene Chloride	<5 U
Naphthalene	<2.5 U
n-Propylbenzene	<0.5 U
SVOCs	
Naphthalene	<4.9 U
Phenol	<6.8 U
Metals - Total	
Antimony	<50 U
Arsenic	<5 U
Barium	212
Beryllium	<5 U
Cadmium	<5 U
Chromium, Total	10
Copper	65
Iron	3,200
Lead	<10 U
Magnesium	4300
Manganese	632
Nickel	<25 U
Sodium	190,000
Zinc	<50 U

Location	TRC-MW-2
Sample Name	TRC-MW-2
Sample Date	08/06/2007
VOCs	
1,2,4-Trimethylbenzene	<2.5 U
Benzene	<0.5 U
Ethylbenzene	<0.5 U
Hexachlorobutadiene	0.83
Isopropylbenzene (Cumene)	<0.5 U
Methylene Chloride	<5 U
Naphthalene	<2.5 U
n-Propylbenzene	<0.5 U
SVOCs	
Naphthalene	<5 U
Phenol	<7 U
Metals - Total	
Antimony	<50 U
Arsenic	<5 U
Barium	87
Beryllium	<5 U
Cadmium	<5 U
Chromium, Total	<10 U
Copper	<10 U
Iron	<50 U
Lead	<10 U
Magnesium	46,000
Manganese	1,050
Nickel	<25 U
Sodium	270,000
Zinc	<50 U

Location	LG-16
Sample Name	LG-16 081808
Sample Date	08/18/2008
VOCs	
1,2,4-Trimethylbenzene	<5 U
Benzene	<5 U
Ethylbenzene	<5 U
Hexachlorobutadiene	NA
Isopropylbenzene (Cumene)	<5 U
Methylene Chloride	<5 U
n-Propylbenzene	<5 U
SVOCs	
Naphthalene	<10 U
Phenol	8.4 J
Metals - Total	
Antimony	47 J
Arsenic	77 J
Barium	9,000
Beryllium	24
Cadmium	20 J
Chromium, Total	1,700
Copper	4,000
Iron	360,000
Lead	550
Magnesium	411,000
Manganese	16,800
Nickel	1,600
Sodium	392,000
Zinc	4,800

Location	MW-10
Sample Name	MW-10_052313
Sample Date	05/23/2013
VOCs	
1,2,4-Trimethylbenzene	<2.5 U
Benzene	<2.5 U
Ethylbenzene	<2.5 U
Hexachlorobutadiene	<2.5 U
Isopropylbenzene (Cumene)	<2.5 U
Methylene Chloride	5.9
Naphthalene	<2.5 U
n-Propylbenzene	<2.5 U
SVOCs	
Naphthalene	<0.0104 U
Phenol	<1.47 U
Metals - Total	
Antimony	<5 U
Arsenic	<4 U
Barium	69
Beryllium	<1 U
Cadmium	<3 U
Chromium, Total	<5 U
Copper	<5 U
Iron	4,300
Lead	<10 U
Magnesium	23,000
Manganese	632
Nickel	<25 U
Sodium	53,200
Zinc	<20 U

Location	MW-3	MW-3
Sample Name	MW-3_081208	MW-3_052313
Sample Date	08/12/2008	05/23/2013
VOCs		
1,2,4-Trimethylbenzene	21	<2.5 U
Benzene	7.9 J	<2.5 U
Ethylbenzene	7.8	<2.5 U
Hexachlorobutadiene	NA	<2.5 U
Isopropylbenzene (Cumene)	11	<2.5 U
Methylene Chloride	<5 U	7.2
Naphthalene	NA	<2.5 U
n-Propylbenzene	25	<2.5 U
SVOCs		
Naphthalene	23	<0.00881 U
Phenol	<1 U	<1.28 U
Metals - Dissolved		
Antimony	<20 U	NA
Arsenic	<20 U	NA
Barium	120	NA
Beryllium	<3 U	NA
Cadmium	<5 U	NA
Chromium, Total	<10 U	NA
Copper	7.8 J	NA
Iron	<200 U	NA
Lead	<10 U	NA
Magnesium	22,500	NA
Manganese	620	NA
Nickel	<25 U	NA
Sodium	25,100	NA
Metals - Total		
Antimony	<20 U	<5 U
Arsenic	<20 U	<4 U
Barium	120	208
Beryllium	<3 U	<1 U
Cadmium	<5 U	<3 U
Chromium, Total	<10 U	<5 U
Copper	7.8 J	10
Iron	3,200	5
Lead	<10 U	<10 U
Magnesium	21,400	21,600
Manganese	497	20
Nickel	<25 U	<25 U
Sodium	73,100	124,000
Zinc	16	16

Location	MW-6
Sample Name	MW-6_052313
Sample Date	05/23/2013
VOCs	
1,2,4-Trimethylbenzene	<2.5 U
Benzene	<2.5 U
Ethylbenzene	<2.5 U
Hexachlorobutadiene	<2.5 U
Isopropylbenzene (Cumene)	<2.5 U
Methylene Chloride	6.2
Naphthalene	<2.5 U
n-Propylbenzene	<2.5 U
SVOCs	
Naphthalene	<0.0111 U
Phenol	<1.57 U
Metals - Total	
Antimony	<5 U
Arsenic	<4 U
Barium	79
Beryllium	<1 U
Cadmium	<3 U
Chromium, Total	<5 U
Copper	<5 U
Iron	529
Lead	<3 U
Magnesium	26,700
Manganese	352
Nickel	<5 U
Sodium	47,200
Zinc	<20 U

Location	MW-9
Sample Name	MW-9_052313
Sample Date	05/23/2013
VOCs	
1,2,4-Trimethylbenzene	<2.5 U
Benzene	<2.5 U
Ethylbenzene	<2.5 U
Hexachlorobutadiene	<2.5 U
Isopropylbenzene (Cumene)	<2.5 U
Methylene Chloride	6.3
Naphthalene	<2.5 U
n-Propylbenzene	<2.5 U
SVOCs	
Naphthalene	<0.00821 U
Phenol	<1.16 U
Metals - Total	
Antimony	<5 U
Arsenic	<4 U
Barium	72
Beryllium	<1 U
Cadmium	<3 U
Chromium, Total	<5 U
Copper	<5 U
Iron	211
Lead	3
Magnesium	25,800
Manganese	315
Nickel	<5 U
Sodium	71,400
Zinc	21

Location	MW-7	MW-7
Sample Name	MW-7_052313	DUP-1_052313
Sample Date	05/23/2013	05/23/2013
VOCs		
1,2,4-Trimethylbenzene	<2.5 U	<2.5 U
Benzene	<2.5 U	<2.5 U
Ethylbenzene	<2.5 U	<2.5 U
Hexachlorobutadiene	<2.5 U	<2.5 U
Isopropylbenzene (Cumene)	<2.5 U	<2.5 U
Methylene Chloride	7.3	5.6
Naphthalene	<2.5 U	<2.5 U
n-Propylbenzene	<2.5 U	<2.5 U
SVOCs		
Naphthalene	<0.00945 U	<0.00843 U
Phenol	<1.33 U	<1.19 U
Metals - Total		
Antimony	<5 U	<5 U
Arsenic	<4 U	<4 U
Barium	165	143
Beryllium	<1 U	<1 U
Cadmium	<3 U	<3 U
Chromium, Total	<5 U	<5 U
Copper	10	8
Iron	4,000	3,450
Lead	3	3
Magnesium	21,000	20,500
Manganese	351	343
Nickel	<5 U	<5 U
Sodium	53,200	53,800
Zinc	25	<20 U

Location	MW-8
Sample Name	MW-8_052313
Sample Date	05/23/2013
VOCs	
1,2,4-Trimethylbenzene	<2.5 U
Benzene	<2.5 U
Ethylbenzene	<2.5 U
Hexachlorobutadiene	<2.5 U
Isopropylbenzene (Cumene)	<2.5 U
Methylene Chloride	7.8
Naphthalene	<2.5 U
n-Propylbenzene	<2.5 U
SVOCs	
Naphthalene	<0.00945 U
Phenol	<1.33 U
Metals - Total	
Antimony	<5 U
Arsenic	<4 U
Barium	90
Beryllium	<1 U
Cadmium	<3 U
Chromium, Total	<5 U
Copper	<5 U
Iron	144
Lead	<3 U
Magnesium	25,500
Manganese	1,660
Nickel	<5 U
Sodium	59,500
Zinc	29

Location	MW-2
Sample Name	MW-2_080808
Sample Date	08/08/2008
VOCs	
1,2,4-Trimethylbenzene	<1 U
Benzene	<0.5 U
Ethylbenzene	<1 U
Hexachlorobutadiene	NA
Isopropylbenzene (Cumene)	<1 U
Methylene Chloride	0.2 JB
n-Propylbenzene	<1 U
SVOCs	
Naphthalene	<10 U
Phenol	<10 U
Metals - Dissolved	
Antimony	<20 U
Arsenic	<20 U
Barium	110
Beryllium	<3 U
Cadmium	<5 U
Chromium, Total	<10 U
Copper	5.5 J
Iron	<200 U
Lead	<10 U
Magnesium	36,900
Manganese	130
Nickel	3.7 J
Sodium	77,400
Zinc	7.4 J
Metals - Total	
Antimony	<20 U
Arsenic	<20 U
Barium	150
Beryllium	<3 U
Cadmium	<5 U
Chromium, Total	9.9 J
Copper	31
Iron	5,400
Lead	4.4 J
Magnesium	40,900
Manganese	260
Nickel	12
Sodium	81,600
Zinc	24 J

Location	MW-1
Sample Name	MW-1 080808
Sample Date	08/08/2008
VOCs	
1,2,4-Trimethylbenzene	<1 U
Benzene	<0.5 U
Ethylbenzene	<1 U
Hexachlorobutadiene	NA
Isopropylbenzene (Cumene)	<1 U
Methylene Chloride	0.52 JB
n-Propylbenzene	<1 U
SVOCs	
Naphthalene	<10 U
Phenol	<10 U
Metals - Dissolved	
Antimony	<20 U
Arsenic	<20 U
Barium	99
Beryllium	<3 U
Cadmium	<5 U
Chromium, Total	<10 U
Copper	4 J
Iron	<200 U
Lead	<10 U
Magnesium	34,100
Manganese	1,500
Nickel	3.8 J
Sodium	62,200
Zinc	<50 U
Metals - Total	
Antimony	<20 U
Arsenic	<20 U
Barium	97
Beryllium	<3 U
Cadmium	<5 U
Chromium, Total	<10 U
Copper	3.6 J
Iron	370
Lead	<10 U
Magnesium	33,700
Manganese	1,500
Nickel	4.3 J
Sodium	61,700
Zinc	<50 U

Analyte	NYSDEC SGVs
VOCs	
1,2,4-Trimethylbenzene	5
Benzene	1
Ethylbenzene	5
Hexachlorobutadiene	0.5
Isopropylbenzene (Cumene)	5
Methylene Chloride	5
Naphthalene	10
n-Propylbenzene	5
SVOCs	
Naphthalene	10
Phenol	1
Metals - Dissolved	
Antimony	3
Arsenic	25
Barium	1000
Beryllium	3
Cadmium	5
Chromium, Total	50
Copper	200
Iron	300
Lead	25
Magnesium	35,000
Manganese	300
Nickel	100
Sodium	20,000
Zinc	2000
Metals - Total	
Antimony	3
Arsenic	25
Barium	1000
Beryllium	3
Cadmium	5
Chromium, Total	50
Copper	200
Iron	300
Lead	25
Magnesium	35,000
Manganese	300
Nickel	100
Sodium	20,000
Zinc	2000

Exceedance Summary:

10 - Result exceeds NYSDEC SGVs

NOTES:

1. GROUNDWATER SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS (AWQS) AND GUIDANCE VALUES FOR DRINKING WATER (CLASS GA), COLLECTIVELY REFERRED TO AS 'NYSDEC SGVs'.
2. ONLY DETECTIONS ARE SHOWN.
3. NYSDEC TOGS 1.1.1 AWQS AND GUIDANCE VALUES EXCEEDANCES ARE HIGHLIGHTED AND BOLDED.
4. VOCs = VOLATILE ORGANIC COMPOUNDS
5. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
6. NA = NOT TESTED
7. GROUNDWATER SAMPLE RESULTS ARE DISPLAYED IN UNITS OF MICROGRAMS PER LITER (ug/l)
8. U = THE ANALYTE WAS ANALYZED FOR, BUT WAS NOT DETECTED AT A LEVEL GREATER THAN OR EQUAL TO THE REPORTING LIMIT (RL); THE VALUE SHOWN IN THE TABLE IS THE RL.
9. J = THE ANALYTE WAS DETECTED ABOVE THE METHOD DETECTION LIMIT (MDL), BUT BELOW THE RL; THEREFORE, THE RESULT IS AN ESTIMATED CONCENTRATION.
10. B = THE ANALYTE WAS FOUND IN THE ASSOCIATED ANALYSIS BATCH BLANK.
11. DUP-1_052313 IS A DUPLICATE SAMPLE OF MW-7_052313
12. BASE MAP IS REFERENCED FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

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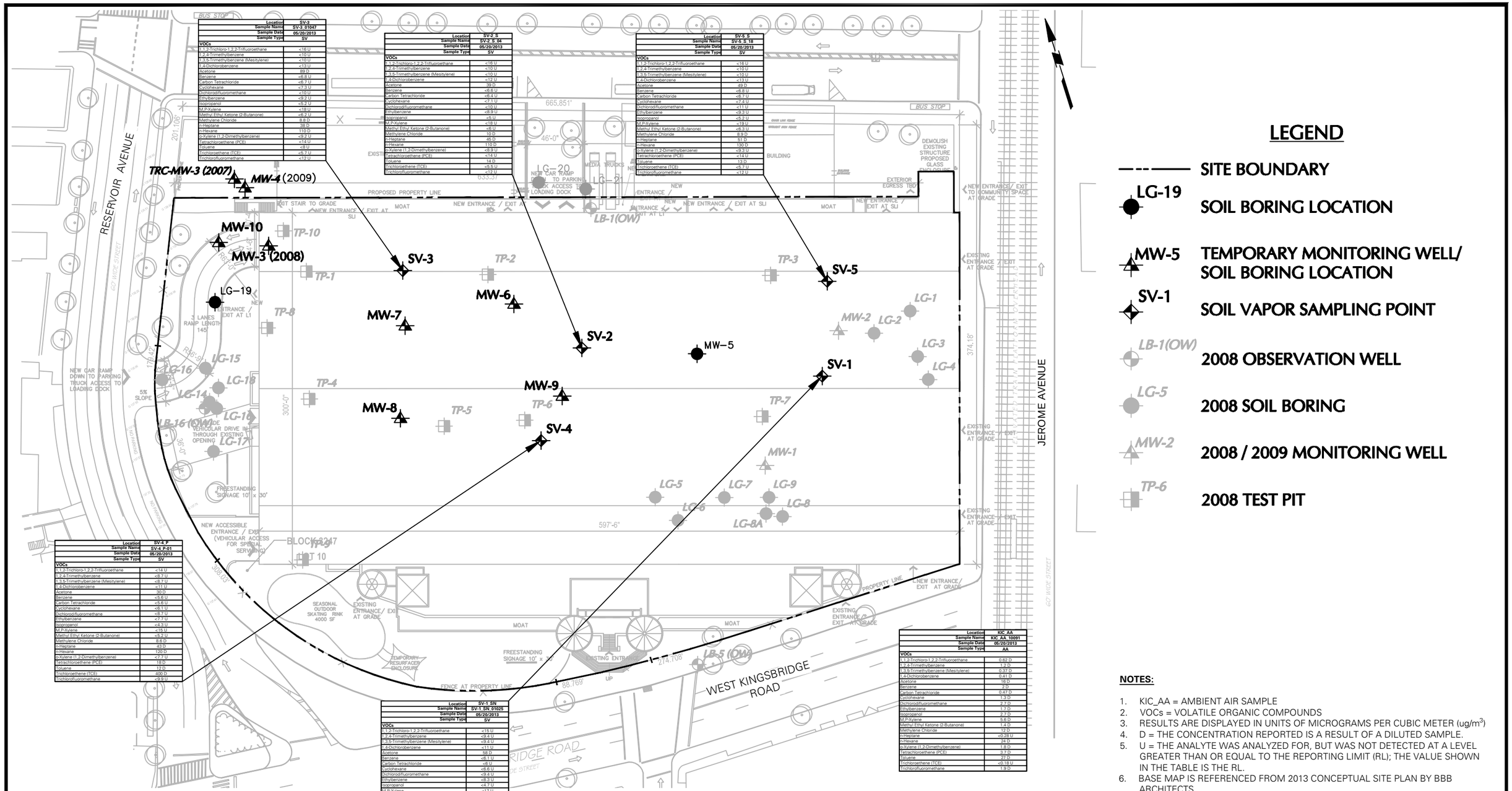
Project
BRONX
KINGSBRIDGE
ARMORY SITE
BLOCK No. 3247, LOT No. 10
BRONX NEW YORK

Figure Title
PREVIOUS GROUNDWATER SAMPLE LOCATION AND ANALYTICAL RESULTS MAP

Project No. 170900201	Figure No. 3C
Date 3/4/2026	
Scale 1" = 80'	
Drawn By MB	
Submission Date	

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Location	SV-3
Sample Name	SV-3_01047
Sample Date	05/20/2013
Sample Type	SV
VOCs	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<16 U
1,2,4-Trimethylbenzene	<10 U
1,3,5-Trimethylbenzene (Mesitylene)	<10 U
1,4-Dichlorobenzene	<13 U
Acetone	89 D
Benzene	<6.8 U
Carbon Tetrachloride	<6.7 U
Cyclohexane	<7.3 U
Dichlorodifluoromethane	<10 U
Ethylbenzene	<9.2 U
Isopropanol	<5.2 U
M,P-Xylene	<18 U
Methyl Ethyl Ketone (2-Butanone)	<6.2 U
Methylene Chloride	8.8 D
n-Heptane	38 D
n-Hexane	110 D
o-Xylene (1,2-Dimethylbenzene)	<9.2 U
Tetrachloroethene (PCE)	<14 U
Toluene	<8 U
Trichloroethene (TCE)	<5.7 U
Trichlorofluoromethane	<12 U

Location	SV-2_S
Sample Name	SV-2_S_04
Sample Date	05/20/2013
Sample Type	SV
VOCs	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<16 U
1,2,4-Trimethylbenzene	<10 U
1,3,5-Trimethylbenzene (Mesitylene)	<10 U
1,4-Dichlorobenzene	<12 U
Acetone	39 D
Benzene	<6.6 U
Carbon Tetrachloride	<6.4 U
Cyclohexane	<7.1 U
Dichlorodifluoromethane	<10 U
Ethylbenzene	<8.9 U
Isopropanol	<5 U
M,P-Xylene	<18 U
Methyl Ethyl Ketone (2-Butanone)	<6 U
Methylene Chloride	10 D
n-Heptane	45 D
n-Hexane	110 D
o-Xylene (1,2-Dimethylbenzene)	<8.9 U
Tetrachloroethene (PCE)	<14 U
Toluene	14 D
Trichloroethene (TCE)	<5.5 U
Trichlorofluoromethane	<12 U

Location	SV-5_S
Sample Name	SV-5_S_18
Sample Date	05/20/2013
Sample Type	SV
VOCs	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<16 U
1,2,4-Trimethylbenzene	<10 U
1,3,5-Trimethylbenzene (Mesitylene)	<10 U
1,4-Dichlorobenzene	<13 U
Acetone	49 D
Benzene	<6.8 U
Carbon Tetrachloride	<6.7 U
Cyclohexane	<7.4 U
Dichlorodifluoromethane	<11 U
Ethylbenzene	<9.3 U
Isopropanol	<5.2 U
M,P-Xylene	<19 U
Methyl Ethyl Ketone (2-Butanone)	<6.3 U
Methylene Chloride	8.9 D
n-Heptane	51 D
n-Hexane	130 D
o-Xylene (1,2-Dimethylbenzene)	<9.3 U
Tetrachloroethene (PCE)	<14 U
Toluene	13 D
Trichloroethene (TCE)	<5.7 U
Trichlorofluoromethane	<12 U

Location	SV-4_P
Sample Name	SV-4_P-01
Sample Date	05/20/2013
Sample Type	SV
VOCs	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<14 U
1,2,4-Trimethylbenzene	<8.7 U
1,3,5-Trimethylbenzene (Mesitylene)	<8.7 U
1,4-Dichlorobenzene	<11 U
Acetone	30 D
Benzene	<5.6 U
Carbon Tetrachloride	<5.6 U
Cyclohexane	<6.1 U
Dichlorodifluoromethane	<8.7 U
Ethylbenzene	<7.7 U
Isopropanol	<4.3 U
M,P-Xylene	<15 U
Methyl Ethyl Ketone (2-Butanone)	<5.2 U
Methylene Chloride	43 D
n-Heptane	120 D
n-Hexane	<7.7 U
o-Xylene (1,2-Dimethylbenzene)	18 D
Tetrachloroethene (PCE)	12 D
Toluene	400 D
Trichloroethene (TCE)	<9.9 U
Trichlorofluoromethane	<10 U

Location	SV-1_SN
Sample Name	SV-1_SN_01025
Sample Date	05/20/2013
Sample Type	SV
VOCs	
1,1,2-Trichloro-1,2,2-Trifluoroethane	<15 U
1,2,4-Trimethylbenzene	<9.4 U
1,3,5-Trimethylbenzene (Mesitylene)	<9.4 U
1,4-Dichlorobenzene	<11 U
Acetone	58 D
Benzene	<8.1 U
Carbon Tetrachloride	<8 U
Cyclohexane	<8.6 U
Dichlorodifluoromethane	<9.4 U
Ethylbenzene	<8.3 U
Isopropanol	<4.7 U
M,P-Xylene	<17 U
Methyl Ethyl Ketone (2-Butanone)	<5.6 U
Methylene Chloride	13 D
n-Heptane	47 D
n-Hexane	120 D
o-Xylene (1,2-Dimethylbenzene)	<8.3 U
Tetrachloroethene (PCE)	<13 U
Toluene	15 D
Trichloroethene (TCE)	<5.1 U
Trichlorofluoromethane	<11 U

Location	KIC_AA
Sample Name	KIC_AA_10091
Sample Date	05/20/2013
Sample Type	AA
VOCs	
1,1,2-Trichloro-1,2,2-Trifluoroethane	0.62 D
1,2,4-Trimethylbenzene	1.2 D
1,3,5-Trimethylbenzene (Mesitylene)	0.37 D
1,4-Dichlorobenzene	0.41 D
Acetone	16 D
Benzene	2 D
Carbon Tetrachloride	0.47 D
Cyclohexane	1.3 D
Dichlorodifluoromethane	2.2 D
Ethylbenzene	1.7 D
Isopropanol	2.7 D
M,P-Xylene	5.6 D
Methyl Ethyl Ketone (2-Butanone)	1.4 D
Methylene Chloride	12 D
n-Heptane	×0.28 U
n-Hexane	24 D
o-Xylene (1,2-Dimethylbenzene)	1.8 D
Tetrachloroethene (PCE)	3.7 D
Toluene	27 D
Trichloroethene (TCE)	×0.18 U
Trichlorofluoromethane	1.9 D

LEGEND

- SITE BOUNDARY
- LG-19 — SOIL BORING LOCATION
- MW-5 — TEMPORARY MONITORING WELL/ SOIL BORING LOCATION
- SV-1 — SOIL VAPOR SAMPLING POINT
- LB-1(OW) — 2008 OBSERVATION WELL
- LG-5 — 2008 SOIL BORING
- MW-2 — 2008 / 2009 MONITORING WELL
- TP-6 — 2008 TEST PIT

NOTES:

1. KIC_AA = AMBIENT AIR SAMPLE
2. VOCs = VOLATILE ORGANIC COMPOUNDS
3. RESULTS ARE DISPLAYED IN UNITS OF MICROGRAMS PER CUBIC METER (ug/m^3)
4. D = THE CONCENTRATION REPORTED IS A RESULT OF A DILUTED SAMPLE.
5. U = THE ANALYTE WAS ANALYZED FOR, BUT WAS NOT DETECTED AT A LEVEL GREATER THAN OR EQUAL TO THE REPORTING LIMIT (RL); THE VALUE SHOWN IN THE TABLE IS THE RL.
6. BASE MAP IS REFERENCED FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

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REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

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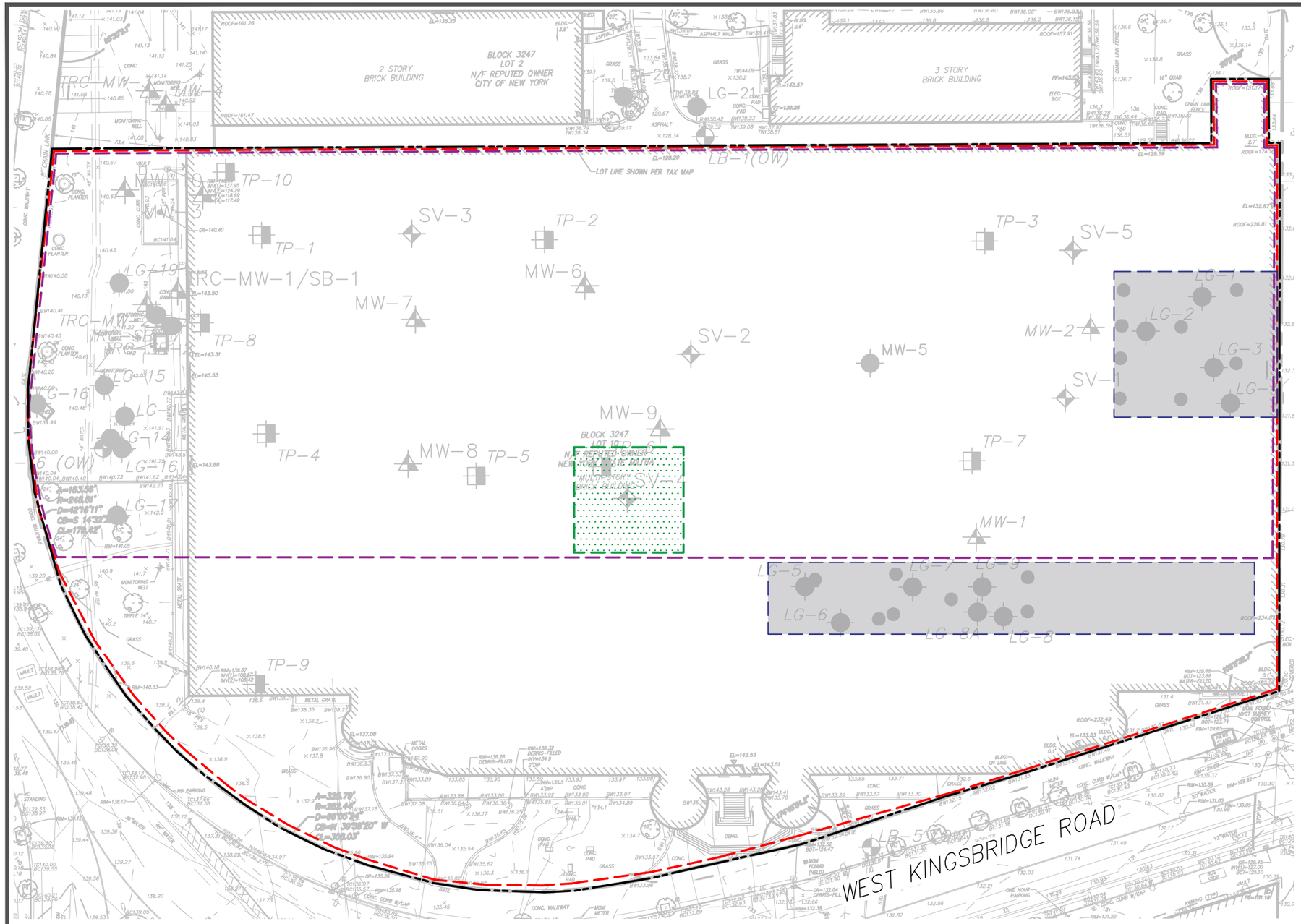
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Figure Title
PREVIOUS SOIL VAPOR SAMPLE LOCATION AND ANALYTICAL RESULTS MAP

Project No. 170900201	Figure No. 3D
Date 3/4/2026	
Scale 1" = 80'	
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LEGEND

- SITE BOUNDARY
- SB-A/1 — 2007 SOIL BORING LOCATION
- MW-2 — 2007–2009 MONITORING WELL LOCATION
- LB-1(OW) — 2008 OBSERVATION WELL LOCATION
- LG-5 — 2008 SOIL BORING LOCATION
- TP-6 — 2008 TEST PIT LOCATION
- LG-19 — 2013 SOIL BORING LOCATION
- MW-5 — 2013 TEMPORARY MONITORING WELL LOCATION
- SV-1 — 2013 SOIL VAPOR SAMPLING POINT
- AOC 1: SVOCs AND METALS IMPACTS IN FILL
- AOC 2: HAZARDOUS LEAD-IMPACTED SOIL IN FORMER RIFLE AND PISTAL RANGES
- AOC 3: PETROLEUM-RELATED VOCs IN GROUNDWATER AND SOIL VAPOR
- AOC 4: CVOCs IN SOIL VAPOR

NOTES:

1. BASE MAP IS REFERENCED FROM TOPOGRAPHIC, BOUNDARY & UTILITY SURVEY, DATED JULY 25, 2019, PREPARED BY LANGAN
2. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
3. VOCs = VOLATILE ORGANIC COMPOUNDS
4. CVOCs = CHLORINATED VOLATILE ORGANIC COMPOUNDS

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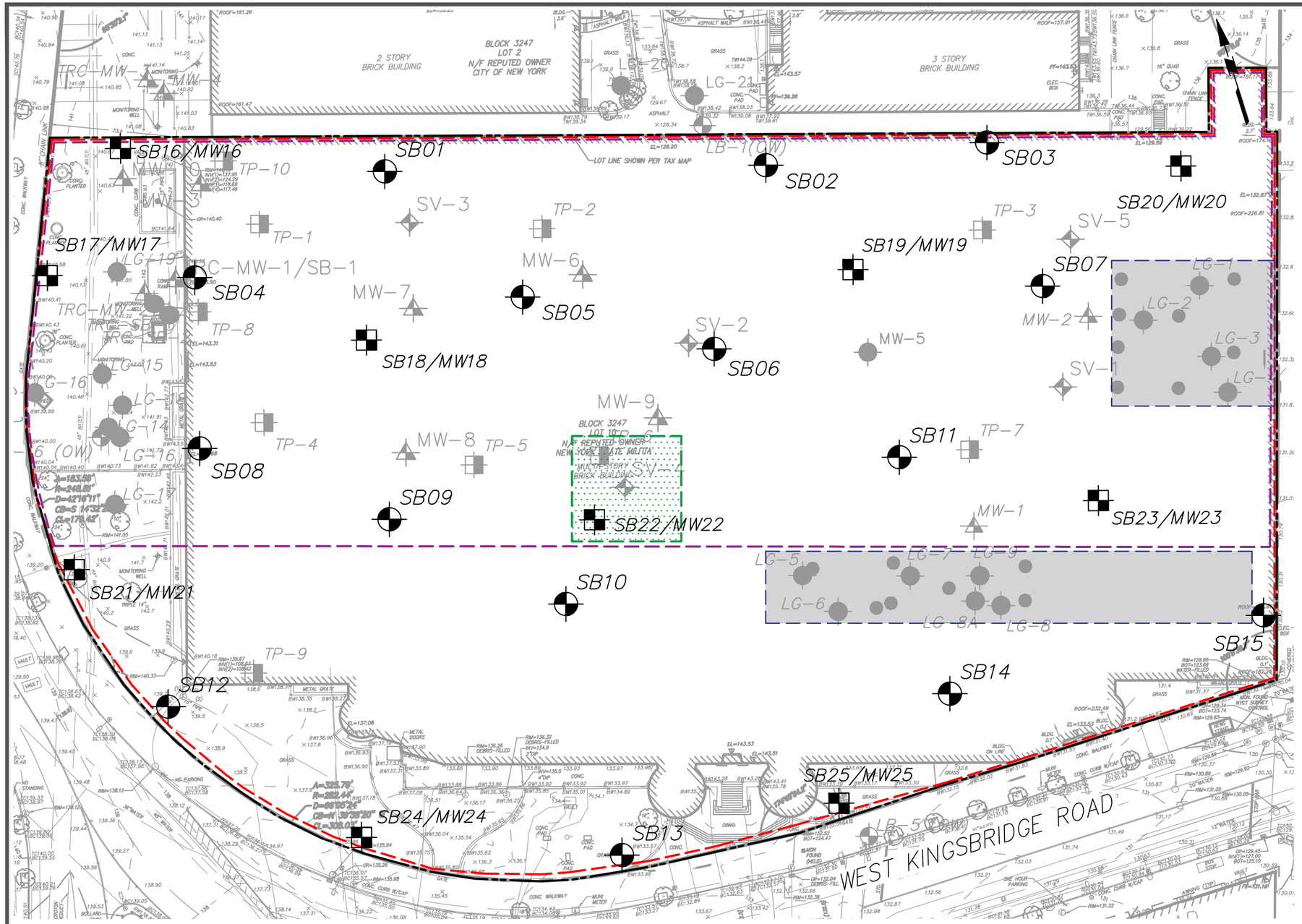
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Figure Title
AREAS OF CONCERN MAP

Project No. 170900201	Figure No. 4
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LEGEND

- SITE BOUNDARY
- SB-A/1 — 2007 SOIL BORING LOCATION
- MW-2 — 2007–2009 MONITORING WELL LOCATION
- LB-1(OW) — 2008 OBSERVATION WELL LOCATION
- LG-5 — 2008 SOIL BORING LOCATION
- TP-6 — 2008 TEST PIT LOCATION
- LG-19 — 2013 SOIL BORING LOCATION
- MW-5 — 2013 TEMPORARY MONITORING WELL LOCATION
- SV-1 — 2013 SOIL VAPOR SAMPLING POINT
- SB01 — PROPOSED SOIL BORING LOCATION
- SB01/MW11 — PROPOSED SOIL BORING/ MONITORING WELL LOCATION
- AOC 1: SVOCs AND METALS IN FILL
- AOC 2: HAZARDOUS LEAD–IMPACTED SOIL
- AOC 3: PETROLEUM–RELATED VOCs IN GROUNDWATER AND SOIL VAPOR
- AOC 4: CVOCs IN SOIL VAPOR

NOTES:

1. BASE MAP IS REFERENCED FROM TOPOGRAPHIC, BOUNDARY & UTILITY SURVEY, DATED JULY 25, 2019, PREPARED BY LANGAN
2. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
3. VOCs = VOLATILE ORGANIC COMPOUNDS
4. CVOCs = CHLORINATED VOLATILE ORGANIC COMPOUNDS

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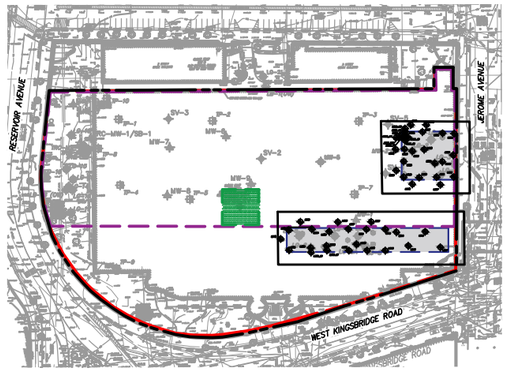
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Figure Title
PROPOSED SOIL BORING PLAN

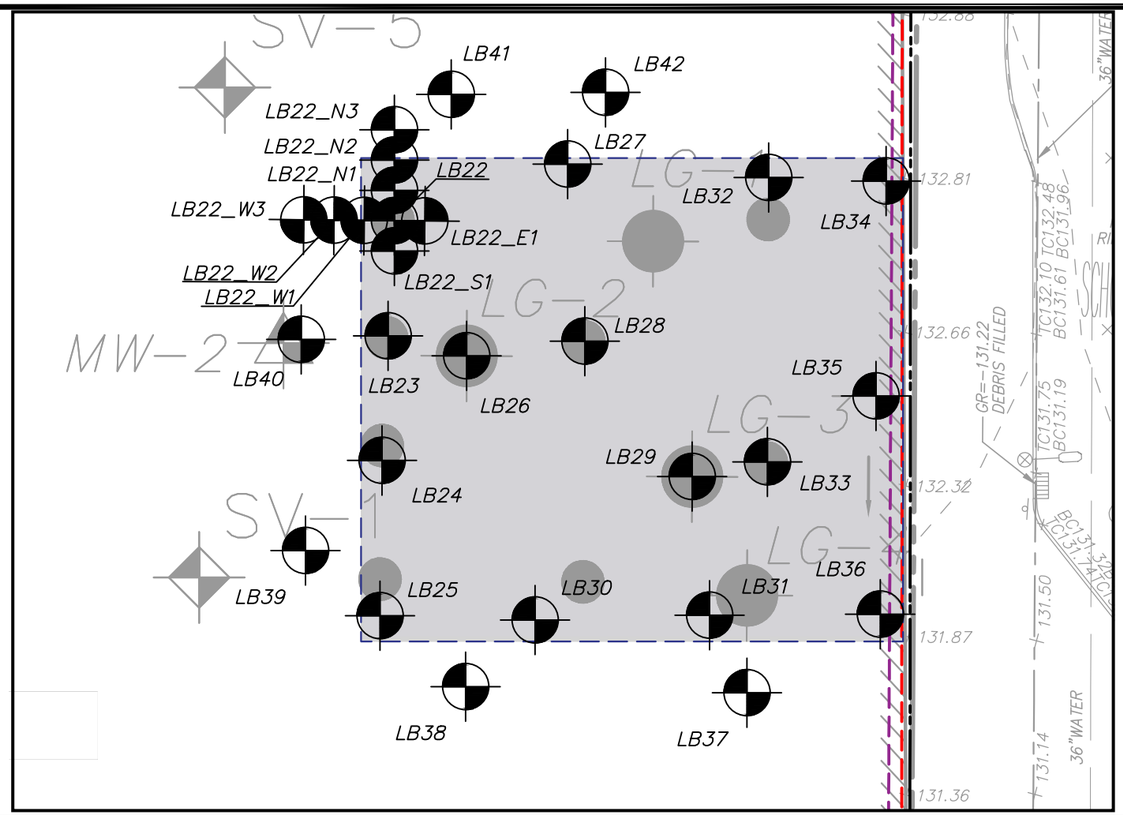
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Date 3/4/2026	
Scale 1" = 60'	
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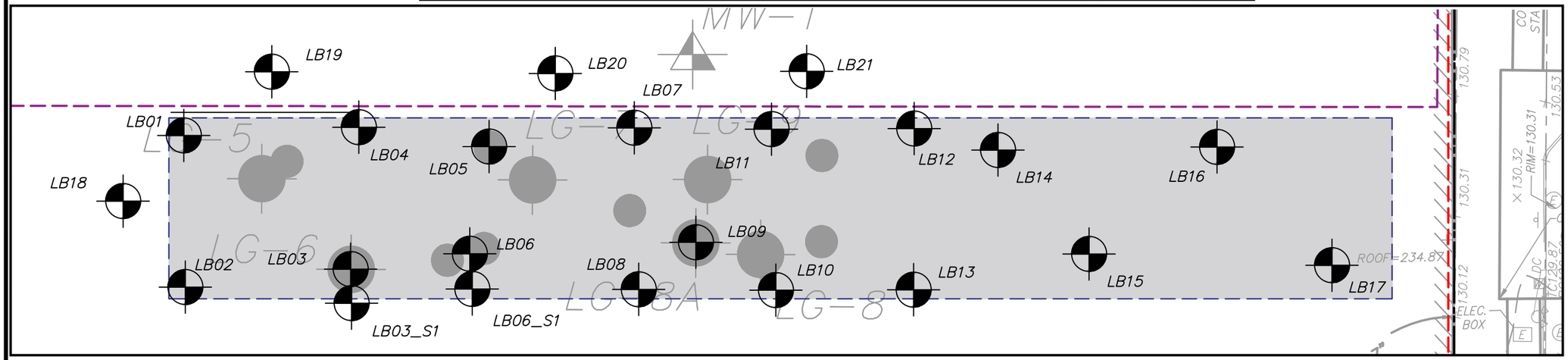


KEY MAP
1" = 250'



LEGEND

- SITE BOUNDARY
- SB-A/1 — 2007 SOIL SAMPLE LOCATION
- MW-2 — 2007-2009 MONITORING WELL LOCATION
- LB-1(OW) — 2008 OBSERVATION WELL LOCATION
- LG-5 — 2008 SOIL BORING LOCATION
- TP-6 — 2008 TEST PIT LOCATION
- LG-19 — 2013 SOIL BORING LOCATION
- MW-5 — 2013 TEMPORARY MONITORING WELL LOCATION
- SV-1 — 2013 SOIL VAPOR SAMPLING POINT
- LB01 — PROPOSED LEAD DELINEATION SOIL BORING LOCATION
- AOC 1: SVOCs AND METALS IN FILL
- AOC 2: HAZARDOUS LEAD-IMPACTED SOIL
- AOC 3: PETROLEUM-RELATED VOCs IN GROUNDWATER AND SOIL VAPOR
- AOC 4: CVOCs IN SOIL VAPOR



NOTES:

1. BASE MAP IS REFERENCED FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS
2. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
3. VOCs = VOLATILE ORGANIC COMPOUNDS
4. CVOCs = CHLORINATED VOLATILE ORGANIC COMPOUNDS

25 0 12.5 25
SCALE IN FEET

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Project
BRONX KINGSBRIDGE ARMORY SITE
BLOCK No. 3247, LOT No. 10
BRONX NEW YORK

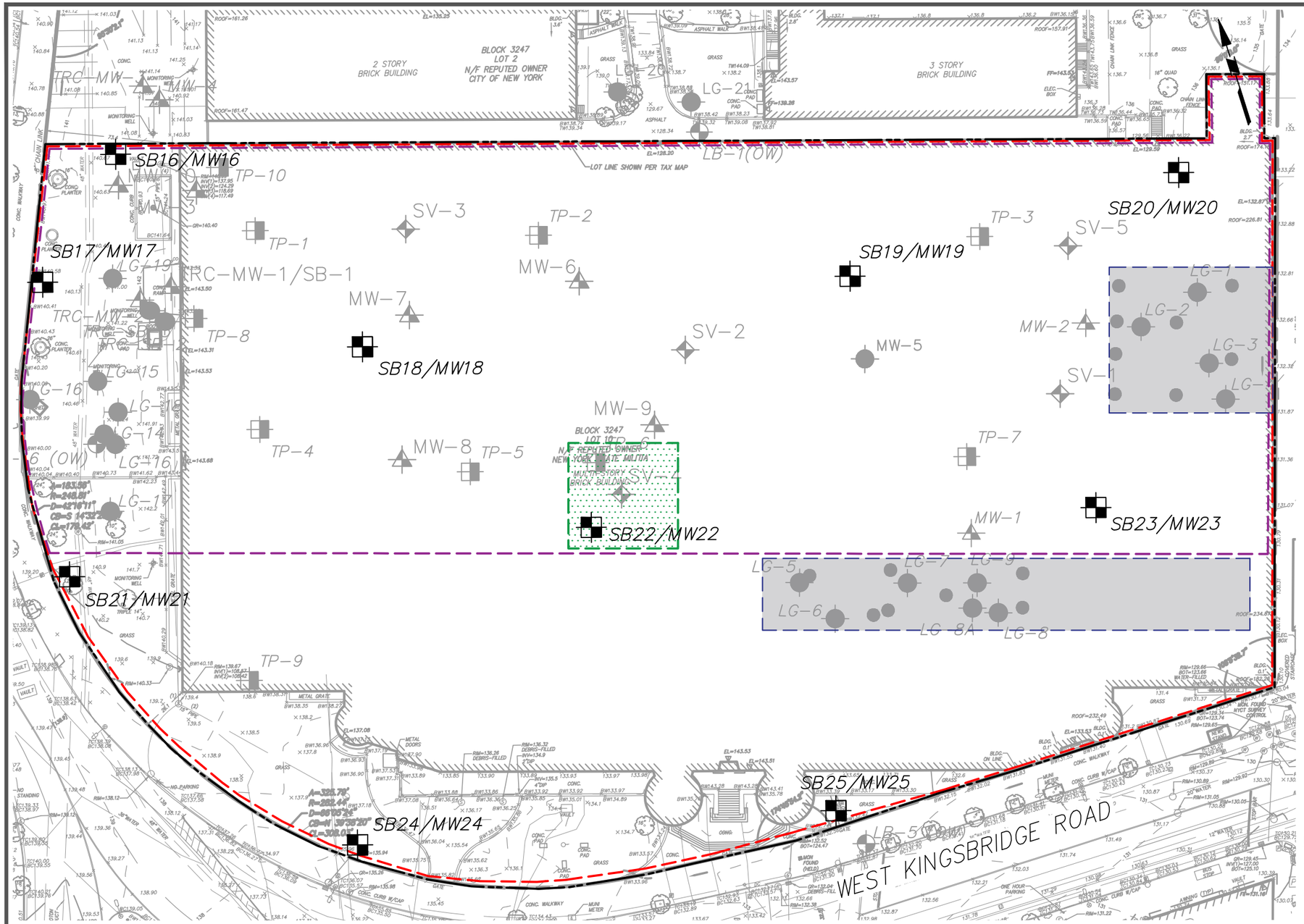
Figure Title
PROPOSED DELINEATION SOIL BORING PLAN

Project No.	170900201
Date	3/4/2026
Scale	1" = 25'
Drawn By	PM
Submission Date	

Figure No. 5B

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Filename: \\langan.com\data\NYC\data2\170900201\Project Data\CAD-PW\01\SheetFiles\RIWP Figures\Figure 5B - Proposed Delineation Soil Boring Plan_rev.dwg Date: 7/23/2026 Time: 16:33 User: kwexler Style Table: ---- Layout: Proposed Soil Boring Plan



LEGEND

- SITE BOUNDARY
- SB-A/1 — 2007 SOIL BORING LOCATION
- MW-2 — 2007–2009 MONITORING WELL LOCATION
- LB-1(OW) — 2008 OBSERVATION WELL LOCATION
- LG-5 — 2008 SOIL BORING LOCATION
- TP-6 — 2008 TEST PIT LOCATION
- LG-19 — 2013 SOIL BORING LOCATION
- MW-5 — 2013 TEMPORARY MONITORING WELL LOCATION
- SV-1 — 2013 SOIL VAPOR SAMPLING POINT
- SB01/MW11 — PROPOSED SOIL BORING/ MONITORING WELL LOCATION
- AOC 1: SVOCs AND METALS IN FILL
- AOC 2: HAZARDOUS LEAD-IMPACTED SOIL
- AOC 3: PETROLEUM-RELATED VOCs IN GROUNDWATER AND SOIL VAPOR
- AOC 4: CVOCs IN SOIL VAPOR

NOTES:

1. BASE MAP IS REFERENCED FROM TOPOGRAPHIC, BOUNDARY & UTILITY SURVEY, DATED JULY 25, 2019, PREPARED BY LANGAN
2. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
3. VOCs = VOLATILE ORGANIC COMPOUNDS
4. CVOCs = CHLORINATED VOLATILE ORGANIC COMPOUNDS

60 0 30 60
SCALE IN FEET

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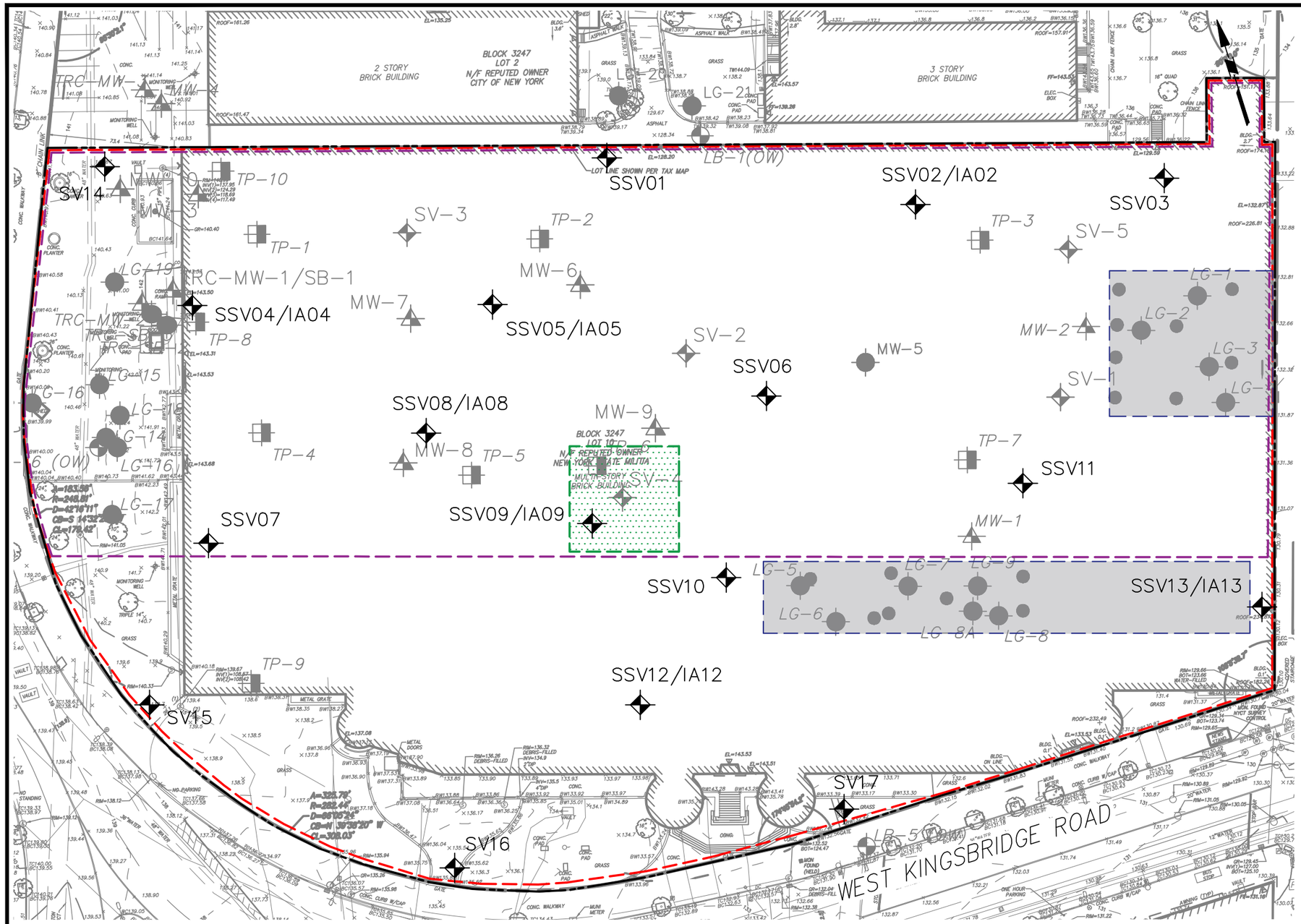
Project
BRONX
KINGSBRIDGE
ARMORY SITE
BLOCK No. 3247, LOT No. 10
BRONX NEW YORK

Figure Title
PROPOSED MONITORING WELL PLAN

Project No. 170900201	Figure No. 5C
Date 3/4/2026	
Scale 1" = 60'	
Drawn By FB	
Submission Date	

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LEGEND

- SITE BOUNDARY
- SB-A/1 — 2007 SOIL BORING LOCATION
- MW-2 — 2007–2009 MONITORING WELL LOCATION
- LB-1(OW) — 2008 OBSERVATION WELL LOCATION
- LG-5 — 2008 SOIL BORING LOCATION
- TP-6 — 2008 TEST PIT LOCATION
- LG-19 — 2013 SOIL BORING LOCATION
- MW-5 — 2013 TEMPORARY MONITORING WELL LOCATION
- SV-1 — 2013 SOIL VAPOR SAMPLING POINT
- SSV01/IA01 — PROPOSED SUB-SLAB SOIL VAPOR/INDOOR AIR SAMPLE LOCATION
- SV16 — PROPOSED SOIL VAPOR SAMPLE LOCATION
- AOC 1: SVOCs AND METALS IMPACTS IN FILL
- AOC 2: HAZARDOUS LEAD-IMPACTED SOIL
- AOC 3: PETROLEUM-RELATED VOCs IN GROUNDWATER AND SOIL VAPOR
- AOC 4: CVOCs IN SOIL VAPOR

NOTES:

1. BASE MAP IS REFERENCED FROM TOPOGRAPHIC, BOUNDARY & UTILITY SURVEY, DATED JULY 25, 2019, PREPARED BY LANGAN
2. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
3. VOCs = VOLATILE ORGANIC COMPOUNDS
4. CVOCs = CHLORINATED VOLATILE ORGANIC COMPOUNDS

60 0 30 60
SCALE IN FEET

WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

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Project
BRONX KINGSBRIDGE ARMORY SITE
BLOCK No. 3247, LOT No. 10
BRONX NEW YORK

Figure Title
PROPOSED SOIL VAPOR INVESTIGATION PLAN

Project No. 170900201	Figure No. **5D**
Date 3/4/2026	
Scale 1" = 60'	
Drawn By FB	
Submission Date	

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TABLES

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
SOIL SAMPLES				
SB01	AOC 1 & 3	SB01_0-2	Shallow fill	Part 375/TCL VOCs via USEPA Method 8260D Part 375/TCL SVOCs via USEPA Method 8270E Part 375/TCL PCBs via USEPA Method 8082A Part 375/TCL Pesticides via USEPA Method 8081B Part 375/TCL Herbicides via USEPA Method 8151A Part 375/TAL Metals, including hexavalent and trivalent chromium and total cyanide by USEPA Methods 6010D/7471B/9010C/7196A PFAS via USEPA Draft Method 1633
		SB01_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB01_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB01_X-X*	Clean interval below observed impacts (if observed)	
SB02	AOC 1 & 3	SB02_0-2	Shallow fill	
		SB02_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB02_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB02_X-X*	Clean interval below observed impacts (if observed)	
SB03	AOC 1 & 3	SB03_0-2	Shallow fill	
		SB03_X-X	Terminus of fill	
		SB03_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB03_X-X*	Clean interval below observed impacts (if observed)	
SB04	AOC 1 & 3	SB04_0-2	Shallow fill	
		SB04_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB04_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB04_X-X*	Clean interval below observed impacts (if observed)	
SB05	AOC 1 & 3	SB05_0-2	Shallow fill	
		SB05_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB05_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB05_X-X*	Clean interval below observed impacts (if observed)	
SB06	AOC 1 & 3	SB06_0-2	Shallow fill	
		SB06_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB06_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB06_X-X*	Clean interval below observed impacts (if observed)	
SB07	AOC 1 & 3	SB07_0-2	Shallow fill	
		SB07_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB07_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB07_X-X*	Clean interval below observed impacts (if observed)	
SB08	AOC 1 & 3	SB08_0-2	Shallow fill	
		SB08_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB08_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB08_X-X*	Clean interval below observed impacts (if observed)	
SB09	AOC 1 & 3	SB09_0-2	Shallow fill	
		SB09_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB09_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB09_X-X*	Clean interval below observed impacts (if observed)	
SB10	AOC 1	SB10_0-2	Shallow fill	
		SB10_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB10_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB10_X-X*	Clean interval below observed impacts (if observed)	

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
SB11	AOC 1 & 3	SB11_0-2	Shallow fill	Part 375/TCL VOCs via USEPA Method 8260D Part 375/TCL SVOCs via USEPA Method 8270E Part 375/TCL PCBs via USEPA Method 8082A Part 375/TCL Pesticides via USEPA Method 8081B Part 375/TCL Herbicides via USEPA Method 8151A Part 375/TAL Metals, including hexavalent and trivalent chromium and total cyanide by USEPA Methods 6010D/7471B/9010C/7196A PFAS via USEPA Draft Method 1633
		SB11_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB11_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB11_X-X*	Clean interval below observed impacts (if observed)	
SB12	AOC 1	SB12_0-2	Shallow fill	
		SB12_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB12_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB12_X-X*	Clean interval below observed impacts (if observed)	
SB13	AOC 1	SB13_0-2	Shallow fill	
		SB13_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB13_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB13_X-X*	Clean interval below observed impacts (if observed)	
SB14	AOC 1	SB14_0-2	Shallow fill	
		SB14_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB14_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB14_X-X*	Clean interval below observed impacts (if observed)	
SB15	AOC 1	SB15_0-2	Shallow fill	
		SB15_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB15_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB15_X-X*	Clean interval below observed impacts (if observed)	
SB16	AOC 1 & 3	SB16_0-2	Shallow fill	
		SB16_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB16_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB16_X-X*	Clean interval below observed impacts (if observed)	
SB17	AOC 1 & 3	SB17_0-2	Shallow fill	
		SB17_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB17_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB17_X-X*	Clean interval below observed impacts (if observed)	
SB18	AOC 1 & 3	SB18_0-2	Shallow fill	
		SB18_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB18_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB18_X-X*	Clean interval below observed impacts (if observed)	
SB19	AOC 1 & 3	SB19_0-2	Shallow fill	
		SB19_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB19_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB19_X-X*	Clean interval below observed impacts (if observed)	
SB20	AOC 1 & 3	SB20_0-2	Shallow fill	
		SB20_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB20_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB20_X-X*	Clean interval below observed impacts (if observed)	

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
SB21	AOC 1	SB21_0-2	Shallow fill	Part 375/TCL VOCs via USEPA Method 8260D Part 375/TCL SVOCs via USEPA Method 8270E Part 375/TCL PCBs via USEPA Method 8082A Part 375/TCL Pesticides via USEPA Method 8081B Part 375/TCL Herbicides via USEPA Method 8151A Part 375/TAL Metals, including hexavalent and trivalent chromium and total cyanide by USEPA Methods 6010D/7471B/9010C/7196A PFAS via USEPA Draft Method 1633
		SB21_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB21_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB21_X-X*	Clean interval below observed impacts (if observed)	
SB22	AOC 1, 3 & 4	SB22_0-2	Shallow fill	
		SB22_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB22_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB22_X-X*	Clean interval below observed impacts (if observed)	
SB23	AOC 1 & 3	SB23_0-2	Shallow fill	
		SB23_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB23_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB23_X-X*	Clean interval below observed impacts (if observed)	
SB24	AOC 1	SB24_0-2	Shallow fill	
		SB24_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB24_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB24_X-X*	Clean interval below observed impacts (if observed)	
SB25	AOC 1	SB25_0-2	Shallow fill	
		SB25_X-X	Terminus of fill OR groundwater interface (whichever is shallower)	
		SB25_X-X*	Soil that exhibits evidence of a chemical or petroleum release (if observed)	
		SB25_X-X*	Clean interval below observed impacts (if observed)	
QA/QC SAMPLES				
TBD	Duplicate	SODUP01_DATE	Duplicate	Part 375/TCL VOCs via USEPA Method 8260D Part 375/TCL SVOCs via USEPA Method 8270E Part 375/TCL PCBs via USEPA Method 8082A Part 375/TCL Pesticides via USEPA Method 8081B Part 375/TCL Herbicides via USEPA Method 8151A Part 375/TAL Metals, including hexavalent and trivalent chromium and total cyanide by USEPA Methods 6010D/7471B/9010C/7196A PFAS via USEPA Draft Method 1633
TBD		SODUP02_DATE		
TBD		SODUP03_DATE		
TBD		SODUP04_DATE		
TBD	Matrix Spike/Matrix Spike Duplicate	SBXX_DATE	Matrix Spike/Matrix Spike Duplicate	
TBD		SBXX_DATE		
TBD		SBXX_DATE		
TBD		SBXX_DATE		
NA	Field Blank	SOFB01_DATE	Field Blank	
NA		SOFB02_DATE		
NA		SOFB03_DATE		
NA		SOFB04_DATE		

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
DELINEATION SOIL SAMPLES				
LB01	AOC 2	LB01_0-1	Fill where hazardous lead impacts were observed	Total and TCLP Lead
		LB01_1-2		
		LB01_2-3		
		LB01_3-4		
LB02	AOC 2	LB02_0-1		
		LB02_1-2		
		LB02_2-3		
		LB02_3-4		
LB03	AOC 2	LB03_0-1		
		LB03_1-2		
		LB03_2-3		
		LB03_3-4		
LB03_S1	AOC 2	LB03_S1_0-1		
		LB03_S1_1-2		
		LB03_S1_2-3		
		LB03_S1_3-4		
LB04	AOC 2	LB04_0-1		
		LB04_1-2		
		LB04_2-3		
		LB04_3-4		
LB05	AOC 2	LB05_0-1		
		LB05_1-2		
		LB05_2-3		
		LB05_3-4		
LB06	AOC 1	LB06_0-1		
		LB06_1-2		
		LB06_2-3		
		LB06_3-4		
LB06_S1	AOC 2	LB06_S1_0-1		
		LB06_S1_1-2		
		LB06_S1_2-3		
		LB06_S1_3-4		
LB07	AOC 2	LB07_0-1		
		LB07_1-2		
		LB07_2-3		
		LB07_3-4		
LB08	AOC 2	LB08_0-1		
		LB08_1-2		
		LB08_2-3		
		LB08_3-4		
LB09	AOC 2	LB09_0-1		
		LB09_1-2		
		LB09_2-3		
		LB09_3-4		

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
LB10	AOC 2	LB10_0-1	Fill where hazardous lead impacts were observed	Total and TCLP Lead
		LB10_1-2		
		LB10_2-3		
		LB10_3-4		
LB11	AOC 2	LB11_0-1		
		LB11_1-2		
		LB11_2-3		
		LB11_3-4		
LB12	AOC 2	LB12_0-1		
		LB12_1-2		
		LB12_2-3		
		LB12_3-4		
LB13	AOC 2	LB13_0-1		
		LB13_1-2		
		LB13_2-3		
		LB13_3-4		
LB14	AOC 2	LB14_0-1		
		LB14_1-2		
		LB14_2-3		
		LB14_3-4		
LB15	AOC 2	LB15_0-1		
		LB15_1-2		
		LB15_2-3		
		LB15_3-4		
LB16	AOC 2	LB16_0-1		
		LB16_1-2		
		LB16_2-3		
		LB16_3-4		
LB17	AOC 2	LB17_0-1		
		LB17_1-2		
		LB17_2-3		
		LB17_3-4		
LB18	AOC 2	LB18_0-1		
		LB18_1-2		
		LB18_2-3		
		LB18_3-4		

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
LB19	AOC 2	LB19_0-1	Fill where hazardous lead impacts were observed	Total and TCLP Lead
		LB19_1-2		
		LB19_2-3		
		LB19_3-4		
LB20	AOC 2	LB20_0-1		
		LB20_1-2		
		LB20_2-3		
		LB20_3-4		
LB21	AOC 2	LB21_0-1		
		LB21_1-2		
		LB21_2-3		
		LB21_3-4		
LB22	AOC 2	LB22_0-1		
		LB22_1-2		
		LB22_2-3		
		LB22_3-4		
LB22_N1	AOC 2	LB22_N1_0-1		
		LB22_N1_1-2		
		LB22_N1_2-3		
		LB22_N1_3-4		
LB22_N2	AOC 2	LB22_N2_0-1		
		LB22_N2_1-2		
		LB22_N2_2-3		
		LB22_N2_3-4		
LB22_N3	AOC 2	LB22_N3_0-1		
		LB22_N3_1-2		
		LB22_N3_2-3		
		LB22_N3_3-4		
LB22_E1	AOC 2	LB22_E1_0-1		
		LB22_E1_1-2		
		LB22_E1_2-3		
		LB22_E1_3-4		
LB22_S1	AOC 2	LB22_S1_0-1		
		LB22_S1_1-2		
		LB22_S1_2-3		
		LB22_S1_3-4		
LB22_W1	AOC 2	LB22_W1_0-1		
		LB22_W1_1-2		
		LB22_W1_2-3		
		LB22_W1_3-4		
LB22_W2	AOC 2	LB22_W2_0-1		
		LB22_W2_1-2		
		LB22_W2_2-3		
		LB22_W2_3-4		

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
LB22_W3	AOC 2	LB22_W3_0-1	Fill where hazardous lead impacts were observed	Total and TCLP Lead
		LB22_W3_1-2		
		LB22_W3_2-3		
		LB22_W3_3-4		
LB23	AOC 2	LB23_0-1		
		LB23_1-2		
		LB23_2-3		
		LB23_3-4		
LB24	AOC 2	LB24_0-1		
		LB24_1-2		
		LB24_2-3		
		LB24_3-4		
LB25	AOC 2	LB25_0-1		
		LB25_1-2		
		LB25_2-3		
		LB25_3-4		
LB26	AOC 2	LB26_0-1		
		LB26_1-2		
		LB26_2-3		
		LB26_3-4		
LB27	AOC 2	LB27_0-1		
		LB27_1-2		
		LB27_2-3		
		LB27_3-4		
LB28	AOC 2	LB28_0-1		
		LB28_1-2		
		LB28_2-3		
		LB28_3-4		
LB29	AOC 2	LB29_0-1		
		LB29_1-2		
		LB29_2-3		
		LB29_3-4		
LB30	AOC 2	LB30_0-1		
		LB30_1-2		
		LB30_2-3		
		LB30_3-4		
LB31	AOC 2	LB31_0-1		
		LB31_1-2		
		LB31_2-3		
		LB31_3-4		
LB32	AOC 2	LB32_0-1		
		LB32_1-2		
		LB32_2-3		
		LB32_3-4		

Table 1
Proposed Soil Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Boring ID	Areas of Concern (AOCs)	Sample ID	Sampling Depth	Analyses
LB33	AOC 2	LB33_0-1	Fill where hazardous lead impacts were observed	Total and TCLP Lead
		LB33_1-2		
		LB33_2-3		
		LB33_3-4		
LB34	AOC 2	LB34_0-1		
		LB34_1-2		
		LB34_2-3		
		LB34_3-4		
LB35	AOC 2	LB35_0-1		
		LB35_1-2		
		LB35_2-3		
		LB35_3-4		
LB36	AOC 2	LB36_0-1		
		LB36_1-2		
		LB36_2-3		
		LB36_3-4		
LB37	AOC 2	LB37_0-1		
		LB37_1-2		
		LB37_2-3		
		LB37_3-4		
LB38	AOC 2	LB38_0-1		
		LB38_1-2		
		LB38_2-3		
		LB38_3-4		
LB39	AOC 2	LB39_0-1		
		LB39_1-2		
		LB39_2-3		
		LB39_3-4		
LB40	AOC 2	LB40_0-1		
		LB40_1-2		
		LB40_2-3		
		LB40_3-4		
LB41	AOC 2	LB41_0-1		
		LB41_1-2		
		LB41_2-3		
		LB41_3-4		
LB42	AOC 2	LB42_0-1		
		LB42_1-2		
		LB42_2-3		
		LB42_3-4		

Notes:
1. TCL - Target Compound List
2. VOCs - Volatile organic compounds
3. SVOCs - Semivolatile organic compounds
4. DATE will take the form MMDDYY
5. PCBs - Polychlorinated biphenyls
6. TAL - Target Analyte List
7. USEPA - United States Environmental Protection Agency
8. PFAS - Per- and polyfluoroalkyl substances
9. * - Sample will only be collected if petroleum or chemical-like impacts are observed
10. TBD - To be determined
11. Quantities of QA/QC samples will be determined according to the QAPP

Table 2
Proposed Groundwater Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Monitoring Well ID	Area of Concern (AOC)	Sample ID	Sampling Depth (feet bgs)	Analyses
GROUNDWATER SAMPLES				
MW16	AOC 1 & 3	MW16_DATE	Middle of the observed water column	TCL VOCs via USEPA Method 8260C TCL SVOCs via USEPA Method 8270D TCL PCBs via USEPA Method 8082A TCL Pesticides via USEPA Method 8081B TCL Herbicides via USEPA method 8151A TAL Metals (Total and Dissolved) (including hexavalet and trivalent chromium, total and dissolved-phase) by USEPA Method 6010C/7470 PFAS via USEPA Method 1633
MW17	AOC 1 & 3	MW17_DATE		
MW18	AOC 1 & 3	MW18_DATE		
MW19	AOC 1 & 3	MW19_DATE		
MW20	AOC 1 & 3	MW20_DATE		
MW21	AOC 1	MW21_DATE		
MW22	AOC 1 & 3	MW22_DATE		
MW23	AOC 1 & 3	MW23_DATE		
MW24	AOC 1	MW24_DATE		
MW25	AOC 1	MW25_DATE		
QA/QC SAMPLES				
Duplicate	NA	GWDUP01_DATE	NA	TCL VOCs via USEPA Method 8260C TCL SVOCs via USEPA Method 8270D TCL PCBs via USEPA Method 8082A TCL Pesticides via USEPA Method 8081B TCL Herbicides via USEPA method 8151A TAL Metals (Total and Dissolved) (including hexavalet and trivalent chromium, total and dissolved-phase) by USEPA Method 6010C/7470 PFAS via USEPA Method 1633
Matrix Spike/Matrix Spike Duplicate		MWXX_DATE		
Field Blank		GWFB01_DATE		
Trip Blank		TB01_DATE		TCL VOCs via USEPA Method 8260C
		TB02_DATE		
		TB03_DATE		

Notes:
1. TCL - Target Compound List
2. VOCs - Volatile organic compounds
3. SVOCs - Semivolatile organic compounds
4. DATE will take the form MMDDYY
5. PCBs - Polychlorinated biphenyls
6. TAL - Target Analyte List
7. USEPA - United States Environmental Protection Agency
8. PFAS - Per- and polyfluoroalkyl substances
9. A PFAS field blank will be collected for each day of PFAS sampling
10. NA - Not Applicable

Table 3
Proposed Soil Vapor, Sub-Slab Vapor, and Indoor Air Sample Summary
Remedial Investigation Work Plan

Kingsbridge Armory
Bronx, New York
Langan Project No. 170900201

Soil Vapor/Sub-Slab Soil Vapor Point ID	Area of Concern (AOC)	Sample ID	Sampling Depth	Sample Type	Analysis
SSV01	AOC 3	SSV01_DATE	6 inches below slab	Sub-Slab Soil Vapor	VOCs by USEPA Method TO-15
SSV02	AOC 3	SSV02_DATE			
SSV03	AOC 3	SSV03_DATE			
SSV04	AOC 3	SSV04_DATE			
SSV05	AOC 3	SSV05_DATE			
SSV06	AOC 3	SSV06_DATE			
SSV07	AOC 3	SSV07_DATE			
SSV08	AOC 3	SSV08_DATE			
SSV09	AOC 3 & 4	SSV09_DATE			
SSV10	AOC 3	SSV10_DATE			
SSV11	AOC 3	SSV11_DATE			
SSV12	AOC 3	SSV12_DATE			
SSV13	AOC 3	SSV13_DATE			
SV14	AOC 3	SV14_DATE	5 feet below grade or 2 feet above groundwater (whichever is shallower)	Soil Vapor	
SV15	AOC 3	SV15_DATE			
SV16	AOC 3	SV16_DATE			
SV17	AOC 3	SV17_DATE			
IA04	AOC 3	IA04_DATE	Three feet above grade surface	Indoor Air	
IA05	AOC 3	IA05_DATE			
IA08	AOC 3	IA08_DATE			
IA09	AOC 3	IA09_DATE			
IA12	AOC 3	IA12_DATE			
IA13	AOC 3	IA13_DATE			
AA01	NA	AA01_DATE			

Notes:
1. DATE will take the form MMDDYY
2. VOCs - Volatile organic compounds
3. USEPA - United States Environmental Protection Agency
4. SV - Soil Vapor
5. SS- Sub-Slab
6. IA - Indoor Air
7. AA - Ambient Air
8. NA - Not Applicable

APPENDIX A

Previous Environmental Reports

ETENVIRONMENTAL
CORPORATION

KINGSBRIDGE ARMORY ROOF REHABILITATION PROJECT
ATTACHMENT A
ENVIRONMENTAL SURVEY REPORT PREPARED BY ATC



Kingsbridge Armory Roof
29 West Kingsbridge Road
Bronx, New York

Environmental Survey of:	KINGSBRIDGE ARMORY 29 WEST KINGSBRIDGE ROAD BRONX, NY 10468
Prepared for:	ET ENVIRONMENTAL CORPORATION 3424 Peachtree Road, NE Suite 200 Atlanta, GA 30326
Prepared by:	ATC ASSOCIATES INC. 104 East 25th Street, 10th Fl. New York, New York 10010
ATC Project #:	75018-0001
Report Date:	August 24, 2000

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H.5 ..... FIELD SKETCHES

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EXECUTIVE SUMMARY

ATC Associates Inc. was contracted by ET Environmental Corp. to conduct a survey of the Kingsbridge Armory 29 West Kingsbridge Road, Bronx, NY. The intent was to identify asbestos containing materials, lead containing and/or lead based paints and coatings, mercury containing switches or lamps, suspect PCB (polychlorinated biphenyls) or DEHP (Di (2-ethylhexyl) phathatlate) containing light ballasts, storage tanks and stored or abandoned materials at the facility.

The survey identified an estimated fourteen thousand two hundred sixty (14,260) feet of thermal system insulation (piping, cementitious joints), thirty-three thousand six hundred sixty (33,660) square feet of flooring materials (floor tiles, linoleum) and two-hundred thirty-five thousand (235,000) square feet of roofing materials (2-tab shingles, built-up roofing, mastics). Additionally, glazing associated with the windows (interior and exterior) and caulking material associated with windows and exterior joints, seams and cracks was identified as asbestos containing materials. Plaster surfaces primarily walls and ceilings were tested throughout the armory and were determined to **not** be an asbestos containing material.

The survey confirmed lead at detectable levels and above for each substrate as follows; 59% of brick, 45% concrete, 73% metal, 89% plaster and 56% wood. Substrates were distinguished by and identified by the exposed coating color. However, variance of lead results within a single testing combination particularly gray painted concrete substrate indicate that the lead containing layer(s) occur below the exposed common layer. Therefore, the generally poor condition of painted surfaces combined with the inability to distinguish painted components by the exposed color all paint should be considered lead containing for purposes of OSHA compliance, waste stream management and environmental dust control.

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No mercury containing switches were observed. Ballasts inspected at various locations of the Armory were found to be not labeled as to content or in poor condition, therefore all ballasts were considered PCB or DEHP containing. An estimated six hundred fifty (650) light fixtures, one thousand two hundred fifty (1,250) bulbs/tubes, seven hundred (700) ballasts and one hundred nine (109)metal halide lights were observed. All PCB/DEHP-contaminated materials should be incinerated, mercury containing lighting lamps, such as: Fluorescent, Mercury Vapor, and High Intensity Discharge lamps (including Metal Halide lamps, High Pressure Sodium lamps, and Low Pressure Sodium lamps) should be disposed through a complete recycling process.

The visual inspection of the Armory grounds indicated that at least four underground storage tanks existed at one time as determined by identified vent pipes and fill ports. Regulatory database review identified five underground storage tanks and two aboveground storage tanks associated with the Armory. An electro-magnetic survey of suspect areas indicated that two buried tanks might exist in the garage parking area. Presumably, these could be the closed tanks identified as tank 1 –diesel and tank 2- unleaded gasoline. Additionally, the survey identified seven additional aboveground 275-gallon storage tanks in the basement not identified in the regulatory database. Tanks 1 and 2 appear to have been closed and abandoned in place, which can be verified by test pits. Additional investigation is required to ascertain the disposition of tanks 3 through 7. The seven aboveground storage tanks identified by the survey need to be examined/tested for product type, content and eventual disposition.

Throughout the Armory, various paints, solvents and maintenance products were observed that would require consolidation and disposal. Abandoned refrigeration/air conditioner units may contain CFC compounds and require reclamation prior to disposal. Several animal/bird carcasses and small quantities of avian excreta were observed in localized areas, disturbance of these items would require personal protective equipment.

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INTRODUCTION

ATC Associates Inc. was contracted by ET Environmental Corp. to conduct a survey of the Kingsbridge Armory 29 West Kingsbridge Road, Bronx, NY. The intent was to identify asbestos containing materials, lead containing and/or lead based paints and coatings, mercury containing switches or lamps, suspect PCB (polychlorinated biphenyls) or DEHP (Di (2-ethylhexyl) phathatlate) containing light ballasts, storage tanks and stored or abandoned materials at the Kingsbridge Armory.

Messrs James Ruchalski and Jay Dupay of ATC performed the asbestos survey. Mr. Dupay holds certifications from the New York City Department of Environmental Protection as an Asbestos Investigator and the New York State Department of Labor as an Asbestos Inspector and will be the inspector of record for all filings. Mr. Ruchalski holds certification from the New York State Department of Labor as an Asbestos Inspector. Mr. Richard Edwards and Maraina Medinets performed the XRF survey. The survey was performed from July 24 through August 22, 2000.

STANDARDS OF CARE

ATC Associates Inc.'s work was performed in a professional manner with the best interest of our client in mind. Our objective was to perform our work with care, exercising the customary skills and competence of consulting professionals in the relevant disciplines. The conclusions presented in this report are professional opinions based upon visual observations of the site and laboratory results from samples collected and analyzed.

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The opinions and recommendations presented herein apply to site conditions existing at the time of our observations. ATC Associates Inc. cannot act as insurers, and no expressed or implied representation or warrant is included or intended in our report except that our work was performed, within the limits prescribed by our clients, with the customary thoroughness and competence of our profession at the time and place the services were rendered. This report is designed to generally identify the accessible recognized environmental materials identified in the introduction at the facility

ASBESTOS – SURVEY

Guidelines used for the survey were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the survey, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Multiple samples of homogeneous materials were chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Further, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

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Bulk samples of suspect ACM were analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAP). NESHAP is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result is compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification method whereby asbestos percentage, if any, is estimated. While EPA, New York State; and New York City regulations governing ACM consider materials containing greater than 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable. Without additional and more sophisticated analysis, using transmission electron microscopy (TEM), a 1-percent content or less of asbestos in a building material sample may still result in an exposure or possible respiratory hazard should the material be indiscriminately demolished. Therefore, for identification and appropriate asbestos management, ATC recommends that any detected asbestos in a suspect material using PLM be considered asbestos. For those materials revealing no asbestos using PLM, TEM analysis should be conducted for confirmation.

The New York State Department of Health has revised the PLM Stratified Point Counting Method. The new method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. The method specifies a procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB). This category includes any sample in a flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.). Additional materials that may fall into this category are textured paints and stucco, pipe valve and joint packing, and a variety of other applications. These samples must be "ashed" in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.

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ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore, if PLM yields results of 1-percent asbestos or less, the result must be confirmed by TEM. Bulk samples that undergo TEM analysis use the sample reduction methodology stated above for NOB analysis by PLM. ELAP certified laboratories must include the following statement with their PLM analysis results for each "inclusive" (1-percent or less asbestos) NOB sample: "Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy".

Selected samples initially analyzed by Polarized Light Microscopy which yielded a negative PLM result and which are classified as a "non-friable" material, were then re-analyzed utilizing Transmission Electron Microscopy methodology described above. The laboratory performing both these analysis procedures was ATC Associates Inc., located at 104 East 25th Street, New York, New York. The following laboratory accreditation's are included in Appendix C:

- National Voluntary Laboratory Accreditation Program (Lab Code 1187-00)
- New York State Environmental Laboratory Approval Program (Lab No. 10879)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 7054)

ASBESTOS – SURVEY FINDINGS

Two hundred twenty-five bulk samples were collected from representative homogeneous areas throughout the facility. Tabular summary of bulk samples is located in Appendix A with field data/chain of custody forms in Appendix B. Asbestos sample locations and schematic material drawings are located in Appendix H. Based upon visual inspection of representative materials likely to be impacted by the planned interior demolition and/or renovation and bulk sample laboratory analytical results, the following materials have been identified as **asbestos containing materials [ACM]** (greater than one percent asbestos).

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- 2-tab roof shingle
- Built-up roofing
- Tar paper underlayment
- Roofing mastics/adhesives
- Pitch pockets
- 9" x 9" floor tiles (all colors)
- Sheet linoleum
- Corrugated (aircell) pipe insulation
- Cementitious pipe joint insulation associated with corrugated (aircell) pipe insulation
- magnesia (pre-formed block) pipe insulation
- Cementitious pipe joint insulation associated with magnesia (pre-formed block) pipe insulation
- Cementitious pipe joint insulation associated with fiberglass pipe insulation (National Guard Office only)
- window glazing (interior and exterior)
- Caulking material associated with windows and exterior joints, seams and cracks

Thermal system insulation was identified primarily in exposed readily accessible locations throughout the facility as described below. However, concealed thermal system insulation was observed in interstitial wall spaces associated with bathroom fixtures and the plenum area above suspended plaster ceilings.

Sub-basement	No ACM observed
Basement	TSI located on perimeter steam, hot and cold water lines. Piping in hallways has been abated and replaced with non-ACM insulation.
Basement Mezzanine	TSI located on perimeter steam, hot and cold water lines. TSI located on steam lines parallel to hallway in ammunition storage rooms. Asbestos containing flooring in office areas on southern wall.

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Drill Floor	Perimeter steam and hot and cold water lines. Asbestos containing flooring in office areas along southern wall. Asbestos containing window caulking and glazing on all windows.
Drill Floor Mezzanine	TSI located on steam, hot and cold water lines associated with bathrooms. Asbestos containing flooring in office areas on southern wall.
Second Floor	Perimeter steam and hot and cold water lines. Asbestos containing flooring in office areas along southern wall. Asbestos containing window caulking and glazing on all windows.
Third Floor	Perimeter steam and hot and cold water lines. Asbestos containing flooring in office areas along southern wall. Asbestos containing window caulking and glazing on all windows.
Roofs	Built-up and two tab shingle roofing including underlayment, mastics, flashings and adhesives. Mastics, flashing material, adhesives and caulking on gable ends, clerestory bands and parapets.

The survey identified the following estimated quantities of asbestos containing thermal system insulation (piping, cementitious joints), flooring materials (floor tiles, linoleum) and roofing materials (3-tab shingles, built-up roofing, mastics) within the survey boundaries.

Level	Thermal System Insulation (Linear Feet)	Flooring Material (Square Feet)	Roofing (Square Feet)
Basement	7,410	300	-
Basement Mezzanine	2,275	1,000	-
Drill Floor	3,540	6,460	-
Second Floor	675	17,500	-
Third Floor	210	8,400	-
Fourth Floor	150	-	-
Roofs	-	-	235,000
Totals	**14,260**	**33,660**	**235,000**

A detailed table of asbestos containing materials by area is located in Appendix D.

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Based upon visual inspection of materials determined to be impacted by the renovation program and bulk sample laboratory analytical results, the following materials are identified as **not asbestos containing materials** (less than one- percent asbestos).

- Boiler insulation'
- Breeching insulation
- Gray floor coating – drill floor
- Cementitious pipe joint insulation associated with fiberglass pipe insulation (Main armory building)
- 12" x 12" ceiling tile
- 2' x 2' ceiling tile
- 2' x 4' ceiling tile
- Joint compound
- Wall plaster – brown coat
- Wall plaster – white coat
- Ceiling plaster – brown coat
- Ceiling plaster – white coat
- Brown paper under 3-tab shingle
- Wallboard

LEAD – SURVEY (PAINTED SURFACES)

The objective of this survey was to identify existing lead-based paint on potentially impacted building surfaces during pending renovation/demolition activities. All painted components were not sampled with the XRF; rather, the survey sampled representative painted building substrates and components and based on the results assumptions as to lead content are made in this report. If questions arise as to the lead content in paint found on a specific surface not tested by ATC, additional testing may be required.

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A portable Lead Paint Analyzer manufactured by Radiation Monitoring Devices (RMD) was used to test all accessible painted components. The instrument was operated in accordance with manufacturer's instructions and XRF performance characteristic sheet (PCS). Representative readings were taken from each surface. Three calibration readings were taken before and after testing in the facility to ensure proper instrument operation. XRF results were divided into three categories: positive, inconclusive, and negative as defined by the PCS. According to the revised PCS for the RMD device, inconclusive ranges exist only for metal substrates. If the result was inconclusive, a paint chip sample was collected for laboratory analysis to determine the actual result.

LEAD –SURVEY FINDINGS (PAINTED SURFACES)

One thousand one hundred ninety building surfaces were tested with a portable X-Ray Fluorescence analyzer for lead content. Substrates tested within the Armory were; brick, concrete, metal, plaster, sheetrock, and wood. Substrates were distinguished by and identified by the exposed coating color. Bulk samples collected form the steel arch's on the drill floor confirmed lead content on the arched of between 8.92 and 56.67 %. A tabular summary of XRF survey data and bulk samples is located in Appendix E

Substrate	Shots	Shots >.4	Shots > 1	Percent of components with XRF detectable levels of lead	Percent of components with a Lead based coating
Brick	119	70	67	59%	56%
Concrete	178	80	62	45%	35%
Metal	403	295	238	73%	59%
Plaster	207	184	180	89%	87%
Sheetrock	34	0	0	0%	0%
Wood	249	140	106	56%	43%
Sub-Total	1190	769	653	65%	55%
Calibration	35				
Total	1225				

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LEAD – SURVEY (TARGET RANGES)

Waste classification of the soils/sand identified within the basement rifle and pistol ranges was performed to determine proper handling and storage requirements as well as the disposal location (i.e., either RCRA Subtitle "C" landfill or Construction and Demolition (C&D) Subtitle "D" landfill). Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act (RCRA) mandates that the lead containing media be characterized as either hazardous or non-hazardous waste prior to disposal. The TCLP composite samples were representative of the various materials that constituted the waste stream. The Inspector donned disposable gloves, which were changed prior to the collection of each sample. The material was placed into a ziplock bag, sealed, and labeled with a unique identifier. A minimum of 100 grams of material was collected. A chain of custody form was completed and submitted with the samples to the laboratory.

LEAD – SURVEY FINDINGS (TARGET RANGES)

ATC collected four (4) representative four-point composite samples from the basement shooting ranges. Sample 1 was collected form Pistol Ranges 9 – 16, Sample 2 was collected form Pistol Ranges 1 – 8, Sample 3 was collected from the most recently active portion of the Rifle Ranges, Sample 4 was collected from the abandoned portion of the Rifle Ranges behind the steel back stop. Analytical results indicate that the anticipated waste stream from each of the sampled areas contain levels of leachable lead in excess of RCRA standards. All four samples contained leachable lead above 5ppm.

Sample	Location	Analytical Result)
1	Pistol Range 9 – 16	1,480 ppm
2	Pistol Range 1 – 8	655 ppm
3	Rifle Range (active)	23.9 ppm
4	Rifle Range (abandoned)	5.84 ppm

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Based on TCLP results indicating leachable levels of lead greater than 5 ppm, the waste streams generated by the removal of the soils, sands and other material are characterized as a hazardous lead containing solid waste as defined by RCRA.

FLUORESCENT AND HIGH-INTENSITY DISCHARGE LIGHTING (HID)/BALLASTS

A visual walk-through of the Armory was conducted including examination of typical fixtures to ascertain the approximate quantity of mercury containing switches, lamps and suspect PCB or DEHP containing light ballasts. A drawing identifying approximate room locations and quantities of fixtures, bulbs and ballasts in located in Appendix H. No mercury containing switches were observed. Ballasts inspected at various locations of the Armory were found to be not labeled as to content or in poor condition, therefore all ballasts were considered PCB or DEHP containing. An estimated quantity of light fixtures, bulbs and ballasts is as follows:

Level	FIXTURES	Bulbs/Tubes	Ballasts	Metal Halide Lights
Basement	185	450	300	9
Basement Mezzanine	190	300	145	-
Drill Floor	175	300	145	100
Second Floor	100	200	110	-
Third Floor	-	-	-	-
Fourth Floor	-	-	-	-
Totals	**650**	**1250**	**700**	**109**

The primary concern regarding the disposal of used fluorescent ballasts is the health risk associated with polychlorinated biphenyl's (PCBs). Human exposure to these possible carcinogens can cause skin, liver, and reproductive disorders. Fluorescent and high-intensity discharge (HID) ballasts contain a small capacitor that may contain high concentrations of PCBs (greater than 90% pure PCBs or 900,000 ppm). These chemical compounds were widely used as insulators in electrical equipment such as capacitors, switches, and voltage regulators through the late 1970s.

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The Toxic Substances Control Act (TSCA) was enacted in 1976, and subsequently banned the production of PCBs in the United States. The specific regulations governing the use and disposal of PCBs are found in Volume 40 Code of Federal Regulations (CFR) Part 761.

The proper method for disposing used ballasts depends on several factors, such as the type and condition of the ballasts and the regulations or recommendations in effect in the state(s) where you remove or discard them. TSCA specifies the disposal method for ballasts that are leaking PCBs. In addition, generators of PCB-containing ballast wastes may be subject to notification and liability provisions under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) (also known as "Superfund").

Identifying criteria

- All ballasts manufactured through 1979 contain PCBs.
- Ballasts manufactured after 1979 that do not contain PCBs are labeled "No PCBs."
- If a ballast is not labeled "No PCBs," assume it contains PCBs.

DEHP-CONTAINING BALLASTS

Di (2-ethylhexyl) phathatlate (DEHP) is a substance that was used to replace PCBs in certain ballast capacitors beginning in 1979. DEHP in its pure form is listed as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). However, once it has been used in a lighting ballast, it is no longer hazardous as defined by RCRA. (See 40 CFR 261.33, Part 261 Appendix VII, Section 268.34, and Section 268.43.) DEHP is regulated under CERCLA--the Superfund law. The "Reportable Quantity" (RQ) of DEHP under CERCLA is 100 pounds. (See 40 CFR, Section 302.4.) This means that if you are disposing of 100 pounds or more of the material in a 24 hour period (approximately 1,600 fluorescent lighting ballasts), you are required to notify the National Response Center at (800) 424-8802. It also means that parties involved with the disposal of DEHP ballasts may be held liable under Superfund if clean up of the DEHP is required.

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Identifying criteria

- DEHP has been found in ballasts designed for the following lighting fixtures: four foot fluorescent fixtures manufactured between 1979 and 1985
- Eight foot fluorescent fixtures manufactured between 1979 and 1991
- High intensity discharge (HID) fixtures manufactured between 1979 and 1991

MERCURY-CONTAINING LAMPS

Fluorescent and high-intensity discharge (HID) lamps contain a small quantity of mercury that can be harmful to the environment and to human health when improperly managed. Mercury is regulated under RCRA, which is administered by the US Environmental Protection Agency. Under current Federal law, mercury-containing lamps such as fluorescent and HID lamps may be hazardous waste. In addition, incandescent and HID lamps may contain small quantities of lead that can also be potentially harmful to human health and the environment.

STORAGE TANKS

The visual inspection of the Armory grounds indicated that at least four underground storage tanks existed; one underground storage tank (UST) in the western parking area as evidenced by an observed fill port and possible vent line, two UST's associated with the maintenance garage as evidenced by two vent lines and one UST associated with the heating plant of the National Guard Office and garage as evidenced by an observed fill port and vent line. A database search located in Appendix F provided by Environmental Data Resources, Inc. identified five underground storage tanks and two aboveground storage tanks associated with the Armory as follows:

Tank	Product	Capacity (gallons)	Status
1	Diesel	3,000	Closed
2	Unleaded Gasoline	2,000	Closed
3	1,2 or 4 Fuel Oil	2,000	Closed
4	1,2 or 4 Fuel Oil	8,000	Closed
5	Unleaded Gasoline	225	Closed
6	Diesel	225	Unknown
7	Other	275	Unknown

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Additionally, eight additional aboveground 275-gallon storage tanks were identified in the basement southeast hallway opposite the shooting ranges, and not identified in the regulatory database.

Sanborn fire insurance maps for the years 1896, 1900, 1914, 1945, 1950, 1981, 1991, 1992, 1993, 1995 and 1996, and aerial photographs for years 1954, 1966, 1975, 1984 and 1994 provided by Environmental Data Resources, Inc. did not provide any indication of tank locations.

An electro-magnetic of suspect areas was performed by NAEVA (Appendix G) indicated that two buried tanks might exist in the garage parking area. Presumably, these could be the closed tanks identified as tank 1 –diesel and tank 2- unleaded gasoline.

SURVEY LIMITATIONS

No lighting, extensive debris, standing water and microbial growth obscure many areas throughout the facility. These limitations impeded access and restricted viewing of some materials. Access to the upper shed roof and the entire north roof was not possible during this survey.

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CONCLUSIONS AND RECOMMENDATIONS

Asbestos

Asbestos containing materials have been located throughout the Kingsbridge Armory. Asbestos containing materials identified by the survey or revealed by subsequent demolition to be asbestos containing should be removed and disposed of prior to initiation of construction activities. The removal of these materials should be conducted by a State of New York licensed asbestos abatement contractor in accordance with all applicable federal, state, and local regulations. Sufficient sample density exists from the plasters to allow ATC to prepare a New York City Department of Environmental Protection Asbestos Control Program form 5 (Not an Asbestos Project) for demolition of plaster surfaces following abatement of the asbestos containing materials.

Lead - (Painted Surfaces)

All painted surfaces and building components should be assumed to contain lead and be handled in accordance with the requirements of the OSHA Lead Exposure in Construction Standard (29 CFR 1926.62) and any other local requirements. Painted components within the Armory are in generally poor condition throughout and should be considered lead containing for purposes of OSHA compliance, waste stream management and environmental dust control.

This survey does not relieve any renovation/demolition contractors from the responsibility of:

- The Occupational Safety and Health Administration's (OSHA) Construction Industry requirements.
- The Resource Conservation and Recovery Act (RCRA) requirements for testing and disposal of lead-contaminated materials.
- Any other applicable federal, state, or local regulations.

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Lead –(Target Ranges)

All sand including wood dead stop material should be handled and disposed of as lead contaminated material.

PCB/DEHP, Mercury

All PCB/DEHP-contaminated materials should be incinerated pursuant to the U.S. Environmental Protection Agency's PCB Rules 40 CFR Part 761 and relevant state rules and regulations. All mercury containing lighting lamps, such as: Fluorescent, Mercury Vapor, and High Intensity Discharge lamps (including Metal Halide lamps, High Pressure Sodium lamps, and Low Pressure Sodium lamps) should be disposed through a complete recycling process.

Storage Tanks

Tanks 1 and 2 appear to have been closed and abandoned in place, which can be verified by test pits. Additional investigation is required to ascertain the disposition of tanks 3 through 7. The seven aboveground storage tanks identified by the survey need to be examined/tested for product type, content and eventual disposition

MISCELANEOUS

The Kingsbridge Armory is identified as a large quanity generator of hazardous/regulated waste. This registration if inactive should be closed out. Throughout the Armory, various paints, solvents and maintenance products were observed that would require consolidation and disposal. Abandoned refrigeration/air conditioner units may contain CFC compounds and require reclamation prior to disposal. Several animal/bird carcasses and small quantities of avian excreta were observed in localized areas, disturbance of these items would require personal protective equipment.

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APPENDIX A:
SAMPLE ANALYSIS RESULTS IN TABULAR FORM

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	FT1	001	Floor Tile "wood grain"	1	Rm # 1W-6	6% Chrysotile
Armory	FT1	002	Floor Tile "wood grain" 9"x 9"	1	Rm # 1W-6	NA
Armory	FT1	003	Floor Tile "wood grain" 9"x 9"	1	Rm # 1W-6	NA
Armory	MS1	004	Mastic from wood grn ft	1	Rm # 1W-6	INC
Armory	MS1	005	Mastic from wood grn ft	1	Rm # 1W-6	INC
Armory	MS1	006	Mastic from wood grn ft	1	Rm # 1W-6	INC
Armory	FT2	007	Floortile 9"x 9"	1	Rm # 1W-5	18% Chrysotile
Armory	FT2	008	Maroone	1	Rm # 1W-5	NA
Armory	FT2	009	Maroone	1	Rm # 1W-5	NA
Armory	MS2	010	Mastic maroone Floor Tile	1	Rm # 1W-5	INC
Armory	MS2	011	Mastic maroone Floor Tile	1	Rm # 1W-5	INC
Armory	MS2	012	Mastic maroone Floor Tile	1	Rm # 1W-5	INC
Armory	FT3	013	Floor tile brown 9"x 9"	1	Rm # 1E-4	5% Chrysotile
Armory	FT10	014	Floor tile brown 9"x 9"	2	Rm # 2E-3	NA
Armory	FT10	015	Floor tile brown 9"x 9"		Set #1 office	NA
Armory	MS3	016	Mastic Brown - Floor Tile	1	Rm #1E-4	INC
Armory	FT10	017	Floor tile brown 9"x 9"	2	Rm #2E-3	INC
Armory	MS10	018	Mastic brown FT		Set #1 office	INC
Armory	FT4	019	Floor Tile Black 9"x 9"	1	Rm # 1E-1	12% Chrysotile
Armory	FT4	020	Floor Tile Black 9"x 9"	1	Rm # 1E-1	NA
Armory	FT4	021	Floor Tile Black 9"x 9"	1	Rm # 1E-1	NA
Armory	MS4	022	Mastic Black - Floor Tile	1	Rm # 1E-1	INC
Armory	MS4	023	Mastic Black - Floor Tile	1	Rm # 1E-1	INC
Armory	MS4	024	Mastic Black - Floor Tile	1	Rm # 1E-1	INC
Armory	FT5	025	Floor tile - Red 9"x 9"	1	Rm # 1W-4	6% Chrysotile
Armory	FT5	026	Floor tile - Red 9"x 9"	1	Rm # 1W-4	NA
Armory	FT5	027	Floor tile - Red 9"x 9"	1	Rm #1E-2	NA

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	MS5	028	Mastic red	1	Rm # 1W-4	INC
Armory	MS5	029	Mastic red	1	Rm # 1W-4	INC
Armory	MS5	030	Mastic red	1	Rm #1E-2	INC
Armory	FT6	031	Floor tile - blue 9"x 9"	1	Rm # 1W-4	22% Chrysotile
Armory	FT6	032	Floor tile - blue 9"x 9"	1	Rm # 1W-4	NA
Armory	FT6	033	Floor tile - blue 9"x 9"	1	Rm # 1W-4	NA
Armory	MS6	034	Mastic blue - Floor Tile	1	Rm # 1W-4	INC
Armory	MS6	035	Mastic blue - Floor Tile	1	Rm # 1W-4	INC
Armory	MS6	036	Mastic blue - Floor Tile	1	Rm # 1W-4	INC
Shelter		037	Floor tile - white 12" x 12"	BM	Womens Shelter	INC
Shelter		038	Floor tile - white 12" x 12"	BM	Medical Office	INC
Shelter		039	Floor tile - white 12" x 12"	BM	Medical Office	INC
Shelter		040	Mastic white - Floor Tile	BM	Womens shelter medical office	INC
Shelter		041	Mastic white 12" ft	BM	Womens shelter medical office	INC
Shelter		042	Mastic white 12" ft	BM	Womens shelter medical office	INC
Armory	FT7	043	Brown Linoleum	1	Rm #1W-5	2% Chrysotile
Armory	FT11	044	Brown Linoleum	1	Rm #1W-5	NA
Armory	FT7	045	Brown Linoleum	1	Rm #1W-5	NA
Armory	FT8	046	White Linoleum	1	Rm #1W-1	INC
Armory	FT8	047	White Linoleum	1	Rm #1W-1	INC
Armory	FT8	048	White Linoleum	1	Rm #1W-1	INC
Armory	FT9	049	Black Linoleum	1	SWT #2 Upper Office	INC
Armory	FT9	050	Black Linoleum	1	1W - 1	INC
Armory	FT9	051	Black Linoleum	1	SWT #2 Upper Office	INC
Shelter		052	Tan 12" x 12" Floor Tile	BM	Womens Shelter	INC
Shelter		053	Tan 12" x 12" Floor Tile	BM	Hallway	INC
Shelter		054	Tan 12" x 12" Floor Tile	BM	Dorm #	INC

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Shelter		055	Mastic 12"x 12' Floor Tile	BM	Dorm #	INC
Shelter		056	Mastic 12"x 12' Floor Tile	BM	Dorm #	INC
Shelter		057	Mastic 12"x 12' Floor Tile	BM	Dorm #	INC
Shelter		058	Void			VOID
Shelter		059	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		060	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		061	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		062	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		063	2'x 4' Ceiling Tile	BM	Womens shelter lounge	NAD
Shelter		064	2'x 4' Ceiling Tile	BM	Womens shelter lounge	NAD
Shelter		065	2'x 4' Ceiling Tile	BM	Womens shelter cafeteria	NAD
Shelter		066	2'x 4' Ceiling Tile	BM	Womens shelter cafeteria	NAD
Shelter		067	Cove Base	BM	Womens shelter cafeteria	INC
Shelter		068	Cove Base	BM	Womens shelter cafeteria	INC
Shelter		069	Cove Base	BM	Womens shelter cafeteria	INC
Shelter		070	Cove Base	BM	Womens shelter cafeteria	INC
Armory	CT1	071	2'x 4' Ceiling Tile	1	Room 1E2	NAD
Armory	CT1	072	2'x 4' Ceiling Tile	1	Room 1E2	NAD
Armory	CT1	073	2'x 4' Ceiling Tile	1	Room 1E2	NAD
Armory	CT2	074	1'x 1' Ceiling Tile	1	Room 1W4	NAD
Armory	CT2	075	1'x 1' Ceiling Tile	1	Debris on floor 1W4	NAD
Armory	CT2	076	1'x 1' Ceiling Tile	1	Debris on floor 1W5	NAD
Shelter		077	Elbow Mud	BM	Womens shelter	NAD
Shelter		078	Elbow Mud	BM	Womens shelter	NAD
Shelter		079	Elbow Mud	BM	Womens shelter	NAD
Armory	TSI1	080	Woven Pipe Wrap	2	Room 2E2	NAD
Armory	TSI1	081	Woven Pipe Wrap	2	Room 2E3	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	TSI1	082	Woven Pipe Wrap	2	Room 2E4	NAD
Armory		083	Woven Pipe Wrap	2	Room 2E5	NAD
Armory	M1	084	Window Glazing	2	Rm. SE-1	INC
Armory	M1	085	Window Glazing	2	Rm. SE-1	INC
Armory	M1	086	Window Glazing	1	Roof Turret	INC
Armory	M2	087	Wallboard	1	RM. SW-5	NAD
Shelter		088	Wallboard	BM	RM. SW-4	NAD
Shelter		089	Wallboard	BM	Shelter	NAD
Armory		090	Wallboard	SWT-1	Shelter	INC
Armory		091	Wallboard	SWT-1	Turret	INC
Armory		092	Wallboard	SWT-1	Turret	INC
Armory		093	Wallboard	SWT-1	Turret	NAD
Armory		094	Wallboard	SWT-1	Turret	NAD
Armory		095	Wallboard	SWT-1	Turret	NAD
Reserve	1	A-01	9" Grey VFT	2	Rm 2-1	2.7% Chrysotile
Reserve	1	A-02	9" Grey VFT	2	Rm 2-2	NA
Reserve	1	A-03	9" Grey VFT	2	Rm 2-3	NA
Reserve	2	A-04	9" Black VFT	2	Rm 2-1	INC
Reserve	2	A-05	9" Black VFT	2	Rm 2-2	INC
Reserve	2	A-06	9" Black VFT	2	Rm 2-3	INC
Reserve	3	A-07	Mastic on homo # 01 & # 07	2	Rm 2-3	INC
Reserve	3	A-08	Mastic on homo # 01 & # 07	2	Rm 2-1	INC
Reserve	3	A-09	Mastic on homo # 01 & # 07	2	Rm 2-15	INC
Reserve	4	A-10	Grey floor coating	2	Corridor	INC
Reserve	4	A-11	Grey floor coating	2	Corridor	INC
Reserve	4	A-12	Grey floor coating	2	Corridor	INC
Reserve	5	A-13	12" spline ceiling tile	2	Rm 2-1	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Reserve	5	A-14	12" spline ceiling tile	2	Entrance lobby	NAD
Reserve	5	A-15	12" spline ceiling tile	2	Rm 2-3	NAD
Reserve	6	A-16	6" Black vinyl cove base	2	Rm 2-1	INC
Reserve	6	A-17	6" Black vinyl cove base	2	Rm 2-3	INC
Reserve	6	A-18	6" Black vinyl cove base	2	Rm 2-8	INC
Reserve	7	A-19	Mastic ass. with homo # 06	2	Rm 2-1	INC
Reserve	7	A-20	Mastic ass. with homo # 06	2	Rm 2-3	INC
Reserve	7	A-21	Mastic ass. with homo # 06	2	Rm 2-8	INC
Reserve	8	A-22	12" white/grey streaks VFT	2	Rm 2-8	INC
Reserve	8	A-23	12" white/grey streaks VFT	2	Rm 2-8	INC
Reserve	8	A-24	12" white/grey streaks VFT	2	Rm 2-8	INC
Reserve	9	A-25	Mastic ass. with homo # 08	2	Rm 2-8	INC
Reserve	9	A-26	Mastic ass. with homo # 08	2	Rm 2-8	INC
Reserve	9	A-27	Mastic ass. with homo # 08	2	Rm 2-8	INC
Reserve	10	A-28	Wall board as ceiling	1	Corridor	NAD
Reserve	10	A-29	Wall board as ceiling	1	Corridor	NAD
Reserve	10	A-30	Wall board as ceiling	2	Corridor	NAD
Reserve	11	A-31	Outside window caulking (tan)	2	Roof	INC
Reserve	11	A-32	Outside window caulking (tan)	2	Roof	INC
Reserve	11	A-33	Outside window caulking (tan)	2	Roof	INC
Reserve	12	A-34	White window glazing	2	Roof	INC
Reserve	12	A-35	White window glazing	2	Roof	INC
Reserve	12	A-36	White window glazing	2	Roof	INC
Reserve	13	A-37	Coping stone caulking	R	Roof	INC
Reserve	13	A-38	Coping stone caulking	R	Roof	INC
Reserve	13	A-39	Coping stone caulking	R	Roof	INC
Reserve	14	A-40	Tar paper on fiberglass pipe insulation	B	Corridor	INC

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Reserve	14	A-41	Tar paper on fiberglass pipe insulation	B	Corridor	INC
Reserve	14	A-42	Tar paper on fiberglass pipe insulation	B	East side room	INC
Reserve	15	A-43	Cementations pipe fitting on fiberglass pipe	1	Locker room	50% Chrysotile
Reserve	15	A-44	Cementations pipe fitting on fiberglass pipe	B	Corridor	NA
Reserve	15	A-45	Cementations pipe fitting on fiberglass pipe	B	Northside room	NA
Armory	P01	P-01	1st Coat White Wall Plaster	1	RM 1W4	NAD
Armory	P02	P-02	2nd Coat Brown Wall Plaster	1	RM 1W4	NAD
Armory	P01	P-03	1st Coat White Column Plaster	1	Entrance Lobby Column	NAD
Armory	P02	P-04	2nd Coat Brown Column Plaster	1	Entrance Lobby Column	NAD
Armory	P01	P-05	1st Coat White Wall Plaster	1	East Wall of Entrance Lobby	NAD
Armory	P02	P-06	2nd Coat Brown Wall Plaster	1	East Wall of Entrance Lobby	NAD
Armory	P01	P-07	1st Coat White Wall Plaster	1	Room 1E1	NAD
Armory	P02	P-08	2nd Coat Brown Wall Plaster	1	Room 1E1	NAD
Armory	P01	P-09	1st Coat White Ceiling Plaster	1M	RM 1E3 Mezz	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory		P1	Built-up Roofing	R	Existing probe -P1	4% Chrysotile
Armory	P02	P-10	2nd Coat Brown Ceiling Plaster	1M	RM 1E3 Mezz	NAD
Armory	P01	P-11	1st Coat White Ceiling Plaster	1	RM 1E5	NAD
Armory	P02	P-12	2nd Coat Brown Ceiling Plaster	1	RM 1E5	NAD
Armory	P01	P-13	1st Coat White Suspend Ceiling Plaster	1	Lobby Area of West Side Stair Case	NAD
Armory	P02	P-14	2nd Brown Coat Under # P-13	1	Lobby Area of West Side Stair Case	NAD
Armory	P01	P-15	1st Coat White Ceiling Plaster	1	RM 1W6	NAD
Armory	P02	P-16	2nd Coat Brown Ceiling Plaster	1	RM 1W6	NAD
Armory	P01	P-17	1st Coat White Wall Plaster	1	Entrance Area West Turret Room	NAD
Armory	P02	P-18	2nd Coat Brown Wall Plaster	1	Entrance Area West Turret Room	NAD
Armory	P03	P-19	1st Coat White Ceiling Plaster	2	West Side Stair Way Vestibule	NAD
Armory	R	P2	Built-up Roofing	R	Existing probe -P2	5% Chrysotile
Armory	P04	P-20	2nd Coat Brown Ceiling Plaster	2	West Side Stair Way Vestibule	NAD
Armory	P03	P-21	1st Coat White Ceiling Plaster	2		NAD
Armory	P04	P-22	2nd Coat Brown Ceiling Plaster	2		NAD
Armory	P03	P-23	1st Coat White Wall Plaster	2		NAD
Armory	P04	P-24	2nd Coat Brown Wall Plaster	2		NAD
Armory	P03	P-25	1st Coat White Column Plaster	2	Center Hallway Between Turrets	NAD
Armory	P04	P-26	2nd Coat Brown Column Plaster	2	Center Hallway Between Turrets	NAD
Armory	P03	P-27	1st Coat White Ceiling Plaster	3	Corridor Outside 3rd Floor Bar	NAD
Armory	P04	P-28	2nd Coat Brown Ceiling Plaster	3	Corridor Outside 3rd Floor Bar	NAD
Armory	P03	P-29	1st Coat White Wall Plaster	3	Wall North of Bar Room	NAD
Armory	P04	P-30	2nd Coat Brown Wall Plaster	3	Wall North of Bar Room	NAD
Armory	P03	P-31	1st Coat White Ceiling Plaster	2	East Side Room	NAD
Armory	P04	P-32	2nd Coat Brown Ceiling Plaster	2	East Side Room	NAD
Armory	P03	P-33	1st Coat White Wall Plaster	2	Corridor East End	NAD
Armory		P3-3TAB	3 Tab Shingle	R	Existing probe -P3	2% Chrysotile

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NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	P04	P-34	2nd Coat Brown Wall Plaster	2	Corridor East End	NAD
Armory	P03	P-35	1st Coat White Wall Plaster	3		NAD
Armory	P04	P-36	2nd Coat Brown Wall Plaster	3		NAD
Armory	P05	P-37	1st Coat White Wall Plaster	BM	RM-B-16	NAD
Armory	P06	P-38	2nd Coat Brown Wall Plaster	BM	RM-B-16	NAD
Armory	P05	P-39	1st Coat White Ceiling Plaster	BM	RM-B-16	NAD
Armory		P3-FELT	Tar Paper Underlayment	R	Existing probe -P3	2% Chrysotile
Armory		P3-PAP	Paper Underlayment	R	Existing probe -P3	NAD
Armory	P06	P-40	2nd Coat Brown Ceiling Plaster	BM	RM-B-16	NAD
Armory	P05	P-41	1st Coat White Ceiling Plaster	BM	Center S. Room Between Turrets	NAD
Armory	P06	P-42	2nd Coat Brown Ceiling Plaster	BM	Center S. Room Between Turrets	NAD
Armory	P05	P-43	1st Coat White Column Plaster	BM	Center Vestibule By Stairs Going Down	NAD
Armory	P06	P-44	2nd Coat Brown Column Plaster	BM	Center Vestibule By Stairs Going Down	NAD
Armory	P05	P-45	1st Coat White Wall Plaster	BM	N Side Wall of Shelter	NAD
Armory	P06	P-46	2nd Coat Brown Wall Plaster	BM	N Side Wall of Shelter	NAD
Armory	P05	P-47	1st Coat White Wall Plaster	BM	East Side Room of Shelter	NAD
Armory	P06	P-48	2nd Coat Brown Wall Plaster	BM	East Side Room of Shelter	NAD
Armory	P05	P-49	1st Coat White Ceiling Plaster	BM	South Side Room of Shelter	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory		P4-EXT	Built-up Roofing	R	Existing probe -P4	NAD
Armory		P4-FELT	Built-up Roofing	R	Existing probe -P4	NAD
Armory		P4-PAP	3 Tab Shingle	R	Existing probe -P5	2% Chrysotile
Armory	P06	P-50	2nd Coat Brown Ceiling Plaster	BM	South Side Room of Shelter	NAD
Armory	P05	P-51	1st Coat White Ceiling Plaster	BM	RM B-39	NAD
Armory	P06	P-52	2nd Coat Brown Ceiling Plaster	BM	RM B-39	NAD
Armory	P05	P-53	1st Coat White Wall Plaster	BM	RM B-39	NAD
Armory		P5-3TAB	Built-up Roofing	R	Existing probe -P5	Trace Chry
Armory	P06	P-54	2nd Coat Brown Wall Plaster	BM	RM B-39	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory		P5-FELT	Tar Paper Underlayment	R	Existing probe -P5	0.75% Chrysotile
Armory	R-1	R-001	Roofing	R	Flat Roof	3% Chrysotile
Armory	R-1	R-002	Roofing	R	Flat Roof - Elevated Section	NA
Armory	R-1	R-003	Roofing	R	Tower Roof	NA
Armory	R-2	R-004	Cap Stone Caulk	R	Roof	INC
Armory	R-2	R-005	Cap Stone Caulk	R	Roof	INC

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	R-2	R-006	Cap Stone Caulk	R	Roof	INC
Armory	1	R-1	Built-up Roofing (upper)	R	Main Roof	4% Chrysotile
Armory	2	R-2	3-Tab Shingle (lower)	R	Main Roof	3.8% Chrysotile
Armory	3	R-3	Tar Paper Underlayment (lower)	R	Main Roof	NAD
Armory	4	R-4	Paper Underlayment (lower)	R	Main Roof	NAD
Armory	SB-1	SB001	Boiler Mud	SB	Boiler Room	NAD
Armory	SB-1	SB002	Boiler Mud	SB	Boiler Room	NAD
Armory	SB-1	SB003	Boiler Mud	SB	Boiler Room	NAD
Armory	SB-2	SB004	Breeching Insulation	SB	Boiler Room	NAD
Armory	SB-2	SB005	Breeching Insulation	SB	Boiler Room	NAD
Armory	SB-2	SB006	Breeching Insulation	SB	Boiler Room	NAD
Armory	SB-3	SB007	Elbow Mud	SB	Boiler Room	NAD
Armory	SB-3	SB008	Elbow Mud	SB	Boiler Room	NAD
Armory	SB-3	SB009	Elbow Mud	SB	Boiler Room	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

APPENDIX D:
ASBESTOS CONTAINING MATERIALS BY LOCATION

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	1	1E-1	-	1,050	-	-	-	
Armory	1	1E-2	20	1,050	-	-	-	
Armory	1	1E-3	20	150	4	2	1	
Armory	1	1E-4	20	1,120	6	6	3	
Armory	1	1E-5	50	120	-	-	-	
Armory	1	1E-6	50	120	5	4	2	
Armory	1	1E-7	-	-	18	18	9	
Armory	1	1E-8	-	-	10	10	5	
Armory	1	1W-1	20	200	32	6	3	
Armory	1	1W-2	60	500	6	24	12	
Armory	1	1W-3	20	500	6	24	12	
Armory	1	1W-4	20	1,050	7	38	16	
Armory	1	1W-5	-	200	4	16	8	
Armory	1	1W-6	30	400	6	24	12	
Armory	1	1W-7	-	-	-	-	-	
Armory	1	1W-8	-	-	-	-	-	
Armory	1	1W-9	230	-	24	24	24	
Armory	1	Drill Floor	3,000	-	25	50	25	100
Armory	1	SWT-1	-	-	-	-	-	
Armory	1	SWT-2	-	-	-	-	-	
Armory	1	SET-1	-	-	-	-	-	
Armory	1	SET-2	-	-	-	-	-	
Armory	2	2SE-1A	40	1,200	6	12	6	
Armory	2	2SE-1B	165	1,200	6	8	6	
Armory	2	2SE-2	30	1,200	6	12	6	
Armory	2	2SE-3	50	1,200	6	12	6	

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	2	2SE-4	30	1,200	6	12	6	
Armory	2	2SE-5	30	1,200	6	12	6	
Armory	2	2SE-6	100	1,200	7	18	9	
Armory	2	2SE-7	50	1,500	9	18	9	
Armory	2	2SW-1	-	-	5	10	5	
Armory	2	2SW-2	-	-	-	-	-	
Armory	2	2SW-3	-	-	-	-	-	
Armory	2	2SW-4	-	-	-	-	-	
Armory	2	2SW-4-Bathroom	90	3,600	-	-	-	
Armory	2	2SW-5	90	2,000	-	-	-	
Armory	2	2SW-6	-	2,000	10	20	10	
Armory	2	2SW-7	-	-	6	12	6	
Armory	2	2SWT-1	-	-	4	8	4	
Armory	2	2SWT-2	-	-	-	-	-	
Armory	2	2SET-1	-	-	4	8	4	
Armory	2	2SET-2	-					
Armory	2	Hallway	-	-	19	38	19	
Armory	3	Lounge	-	2,700	-	-	-	
Armory	3	3SET-1	50	2,100	-	-	-	
Armory	3	3SET-2	100	2,100	-	-	-	
Armory	3	3SWT1	60	1,500	-	-	-	
Armory	3	3SWT-2	-	-	-	-	-	
Armory	4	4SET-1	-	150	-	-	-	
Armory	4	4SET-2	-	-	-	-	-	
Armory	4	4SWT-1	-	-	-	-	-	
Armory	4	4SWT-2	-	-	-	-	-	

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	B	BE-17	160	-	4	10	5	
Armory	B	C12			6	6	3	
Armory	B	C13			21	24	12	
Armory	B	C15	20	-	-	-	-	
Armory	B	C16	10	-	2	8	4	
Armory	B	C17	20	-	1	4	2	
Armory	B	C18	15	-	1	4	2	
Armory	B	C19	15	-	1	2	1	
Armory	B	C20	20	-	-	-	-	
Armory	B	C21	20	-	-	-	-	
Armory	B	C22	10	-	-	-	-	
Armory	B	C23	40	-	-	-	-	
Armory	B	C24	25	-	-	-	-	
Armory	B	C33A	55	-	7	21	11	
Armory	B	C33B	55	-	-	-	-	
Armory	B	C33C	55	-	-	-	-	
Armory	B	C33D	55	-	-	-	-	
Armory	B	C33E	-	-	-	-	-	
Armory	B	C33F	-	-	15	30	15	
Armory	B	C33G	55	-	-	-	-	
Armory	B	C34	20	-	-	-	-	
Armory	B	C35	30	-	-	-	-	
Armory	B	C36	20	-	1	4	2	
Armory	B	C37	40	-	-	-	-	
Armory	B	C41	15	-	-	-	-	
Armory	B	C42	20	-	-	-	-	

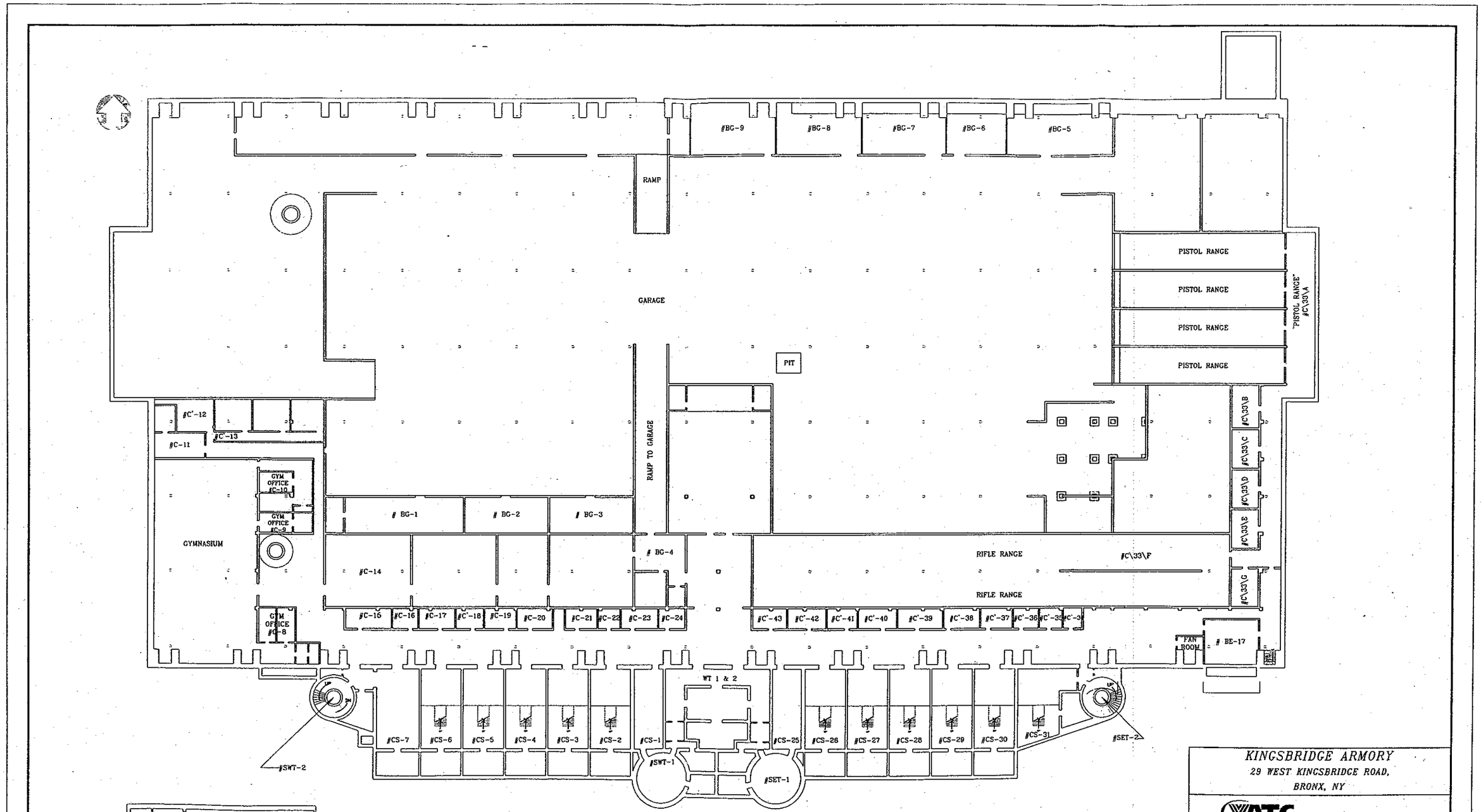
Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	B	C43	40	-	-	-	-	
Armory	B	C14	230	300	14	28	14	
Armory	B	CS1	120	-	14	12	6	
Armory	B	CS12	80	-	6	6	3	
Armory	B	CS2	165	-	12	36	24	
Armory	B	CS26	220	-	14	32	16	
Armory	B	CS27	220	-	12	32	16	
Armory	B	CS28	220	-	14	32	16	
Armory	B	CS29	140	-	14	32	16	
Armory	B	CS3	165	-	12	36	24	
Armory	B	CS30	200	-	14	32	16	
Armory	B	CS31	200	-	14	32	16	
Armory	B	CS4	165	-	15	48	28	
Armory	B	CS5	165	-	12	36	24	
Armory	B	CS6	110	-	12	36	24	
Armory	B	CS7	240	-	5	6	8	
Armory	B	CSS25	105	-	14	12	6	
Armory	B	E1	90	-				
Armory	B	Fan Room	10	-				
Armory	B	Garage	1,550	-	12	24	12	
Armory	B	Gymnasium	1,020	-				
Armory	B	Gymnasium Hallway (EW)	200	-	14	28	15	
Armory	B	Gymnasium Hallway (NS)	300	-	3	6	3	
Armory	B	C9	50	-				
Armory	B	C8	30	-				
Armory	B	C10	100	-				

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	B	SET2	25	-				
Armory	B	SET2	-	-				
Armory	B	Slop Sink Room	30	-				
Armory	B	SWTC1	40	-				
Armory	B	WT1	290	-	18	18	18	
Armory	B	WT2	290	-				
Armory	B	WTC3	50	-				
Armory	BM	A1	-	400				
Armory	BM	B1	50	-	1	4	2	
Armory	BM	B10	250	600				
Armory	BM	B13	15	-				
Armory	BM	B14	140	-				
Armory	BM	B15	40	-				
Armory	BM	B2	50	-				
Armory	BM	B23	50	-	2	4	2	
Armory	BM	B24	25	-				
Armory	BM	B25	55	-				
Armory	BM	B26	25	-				
Armory	BM	B27	30	-	1	3	2	
Armory	BM	B28	20	-				
Armory	BM	B29	50	-	2	8	4	
Armory	BM	B3	50	-	2	4	2	
Armory	BM	B30	50	-				
Armory	BM	B31	50	-				
Armory	BM	B32	50	-	1	4	2	
Armory	BM	B33	50	-	2	4	2	

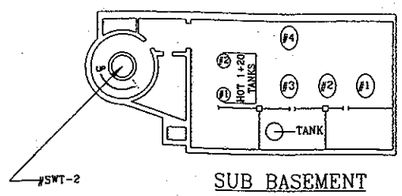
Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	BM	B34	50	-				
Armory	BM	B35	50	-	2	8	4	
Armory	BM	B37	50	-				
Armory	BM	B38	-	-	4	1	2	
Armory	BM	B4	50	-	1	2	1	
Armory	BM	B5	50	-	1	2	1	
Armory	BM	B51	-	-				
Armory	BM	B52	-	-				
Armory	BM	B53	-	-				
Armory	BM	B54	-	-				
Armory	BM	B6	60	-	1	4	2	
Armory	BM	B7	70	-				
Armory	BM	B8	50	-	3	12	6	
Armory	BM	B9	50	-				
Armory	BM	B39			9	36	18	
Armory	BM	B40						
Armory	BM	Balcony	-	-				
Armory	BM	Hallway	20	-	34	68	34	
Armory	BM	Lecture Hall	60	-				9.00
Armory	BM	Loading Area	400	-				
Armory	BM	Open Store Areas	-	-				
Armory	R	Roofing						
Armory	SB	Boiler Room	-	-				
Shelter	B	C33E	55	-				
Shelter	B	C33F	55	-				
Shelter	B	C38	40	-				

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Shelter	B	C39	80	-				
Shelter	B	C40	35	-				
		Flooring Total		**9,850**				
		Thermal System Total	**14,315**		**623**	**1,247**	**680**	**109**
		Roofing Total	**235,000**					

APPENDIX H:
SURVEY DRAWINGS



BASEMENT



SUB BASEMENT
"BOILER ROOM"

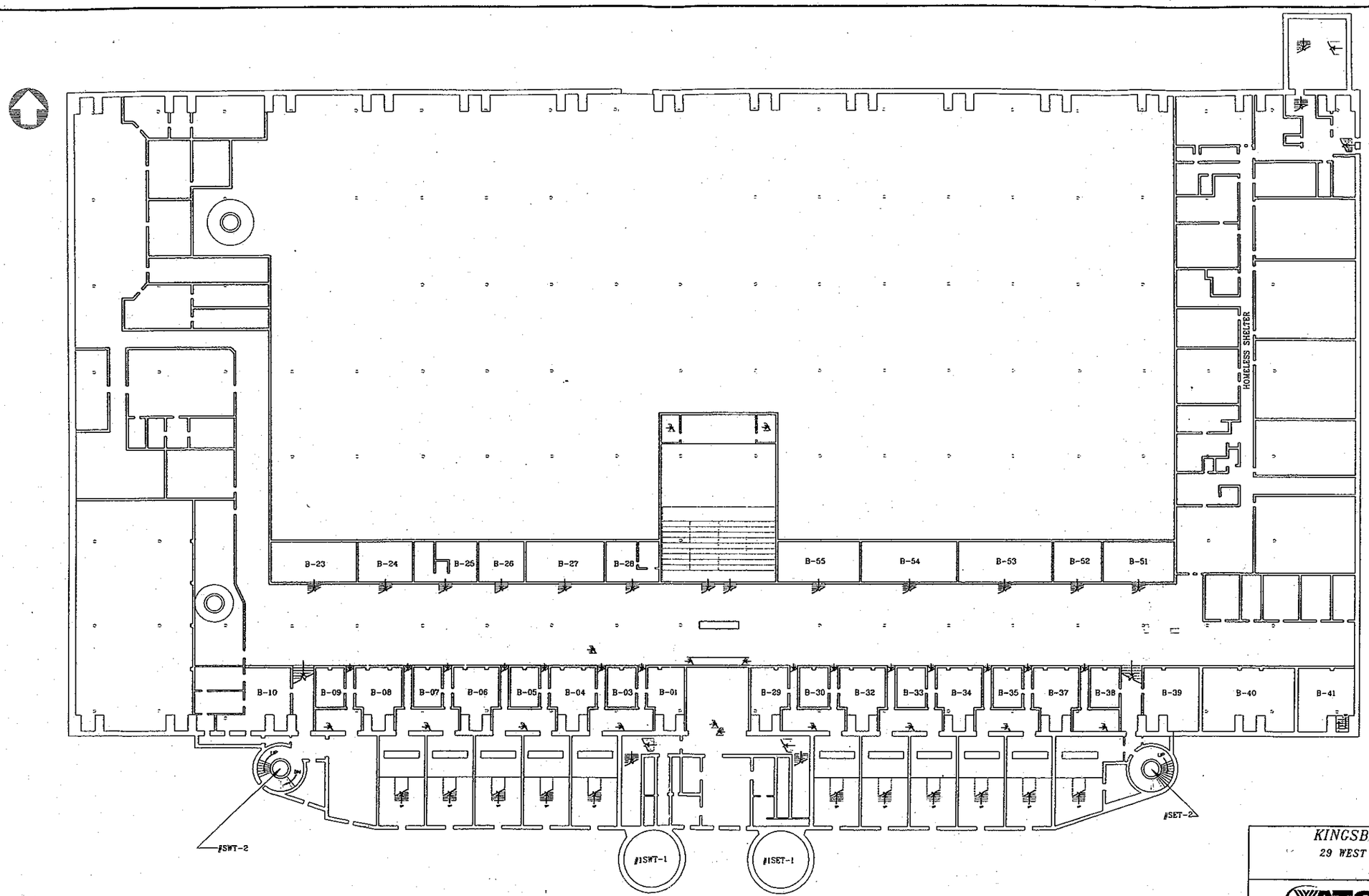
KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

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ROOM NUMBERS
BASEMENT AND SUB BASEMENT "BOILER ROOM"

PROJ.#75018	FILE: M:\CAD94\75018.001\A-1	
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CHECKED BY: J. RUCHALSKI	DATE: 09/21/00	A-1

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BASEMENT MEZZANINE PLAN

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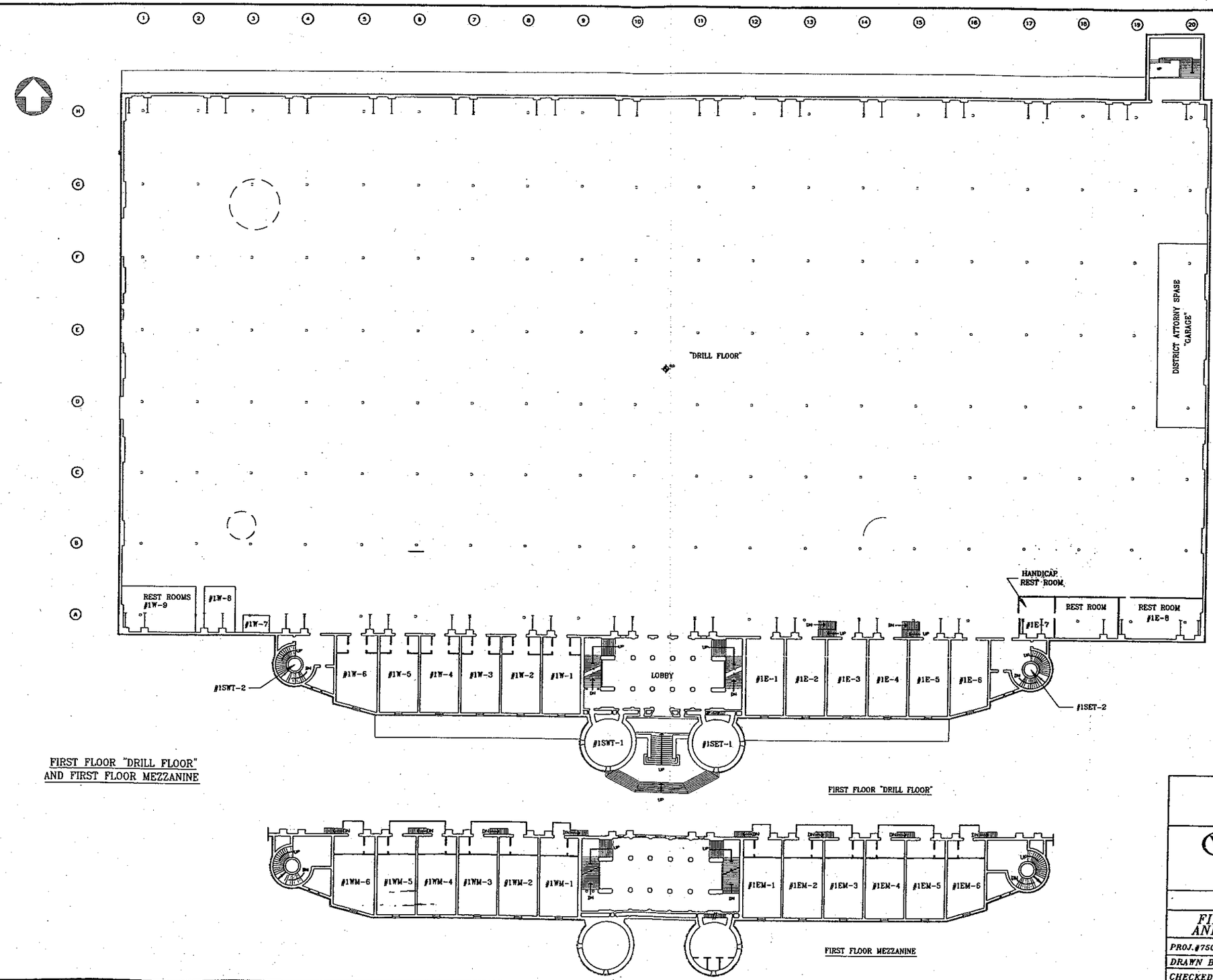
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FIRST FLOOR "DRILL FLOOR"
AND FIRST FLOOR MEZZANINE

FIRST FLOOR "DRILL FLOOR"

FIRST FLOOR MEZZANINE

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
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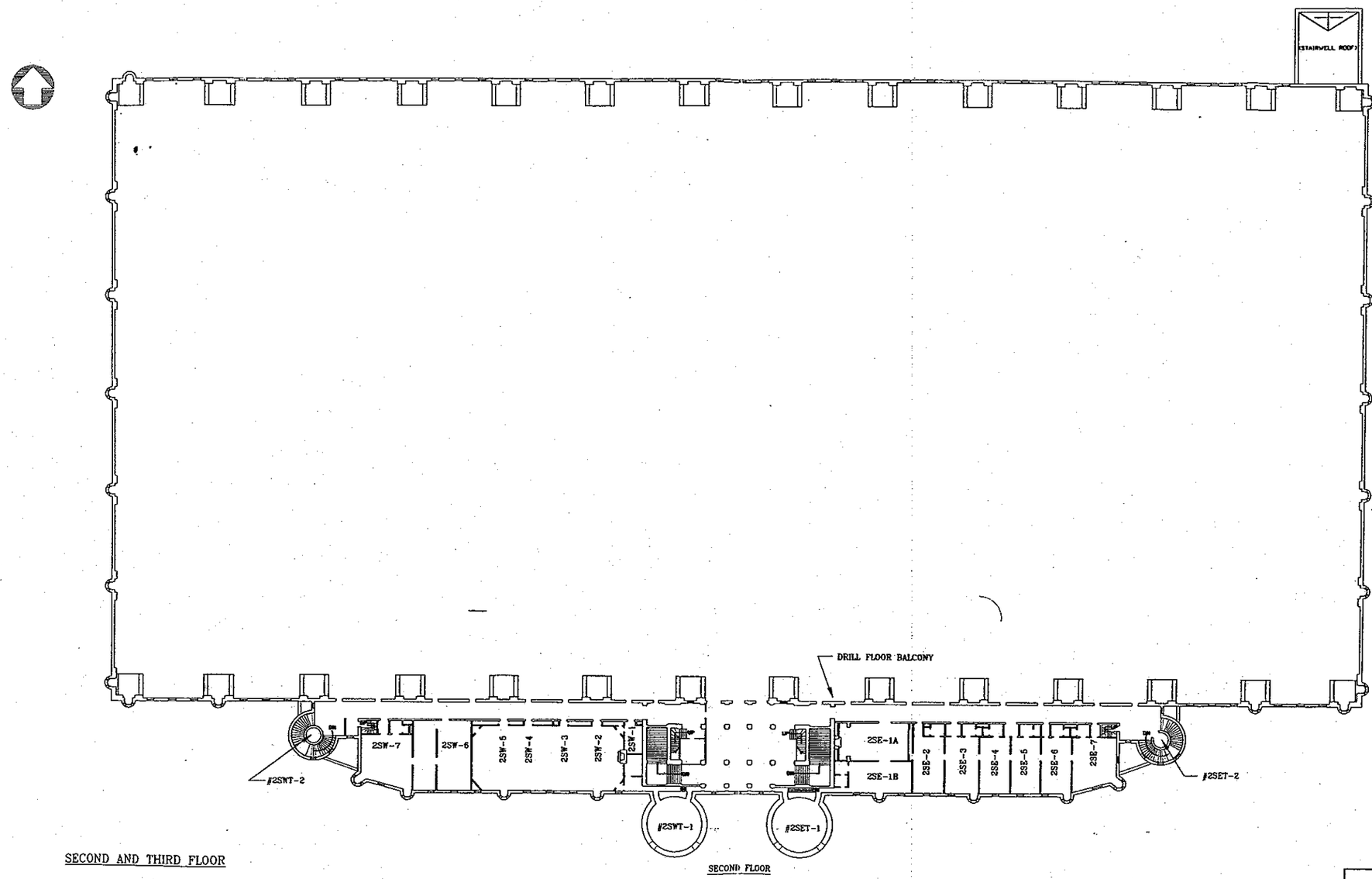
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AND FIRST FLOOR MEZZANINE

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SECOND AND THIRD FLOOR

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

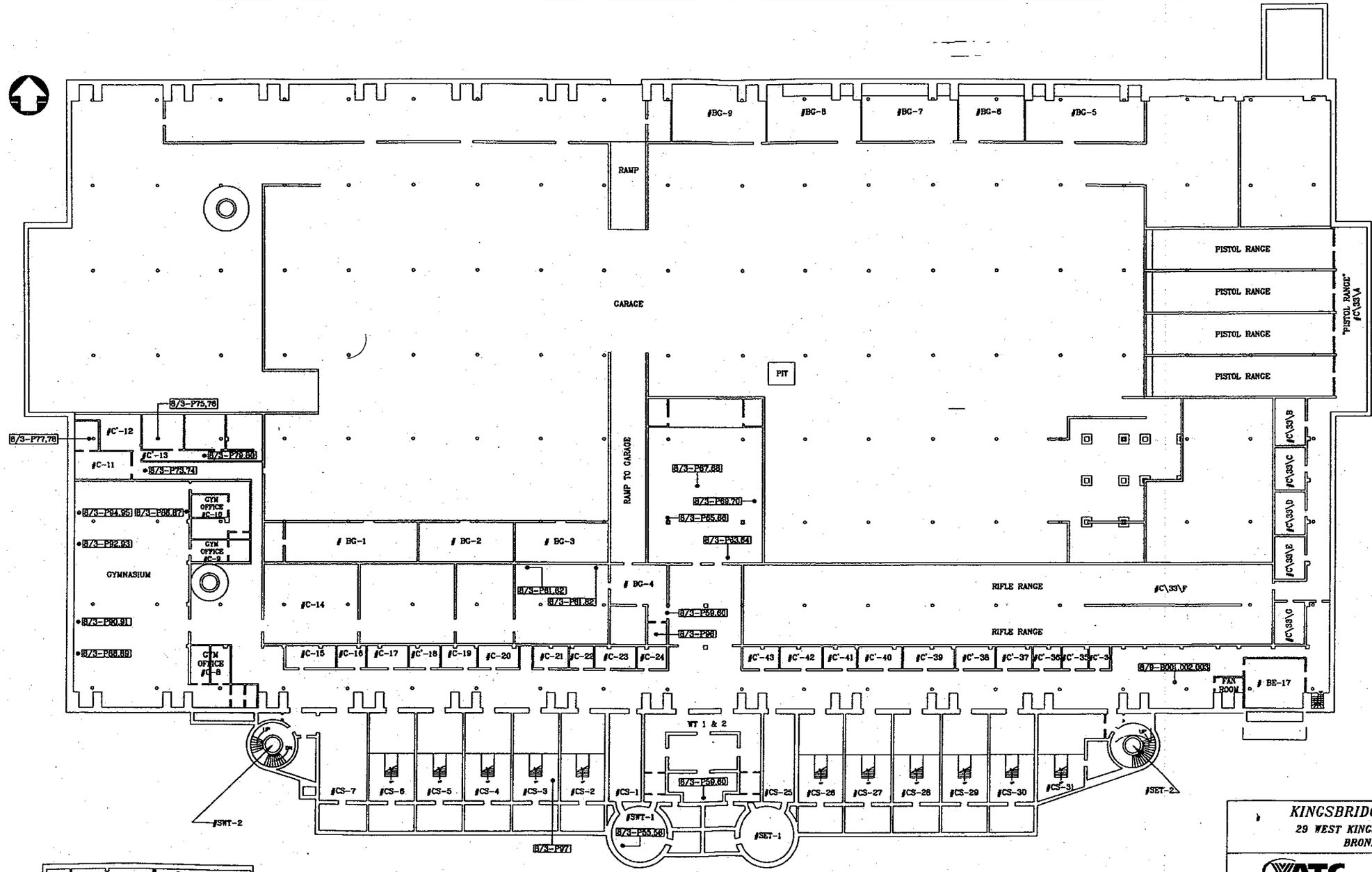
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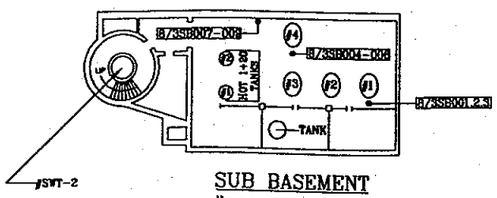
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BASEMENT



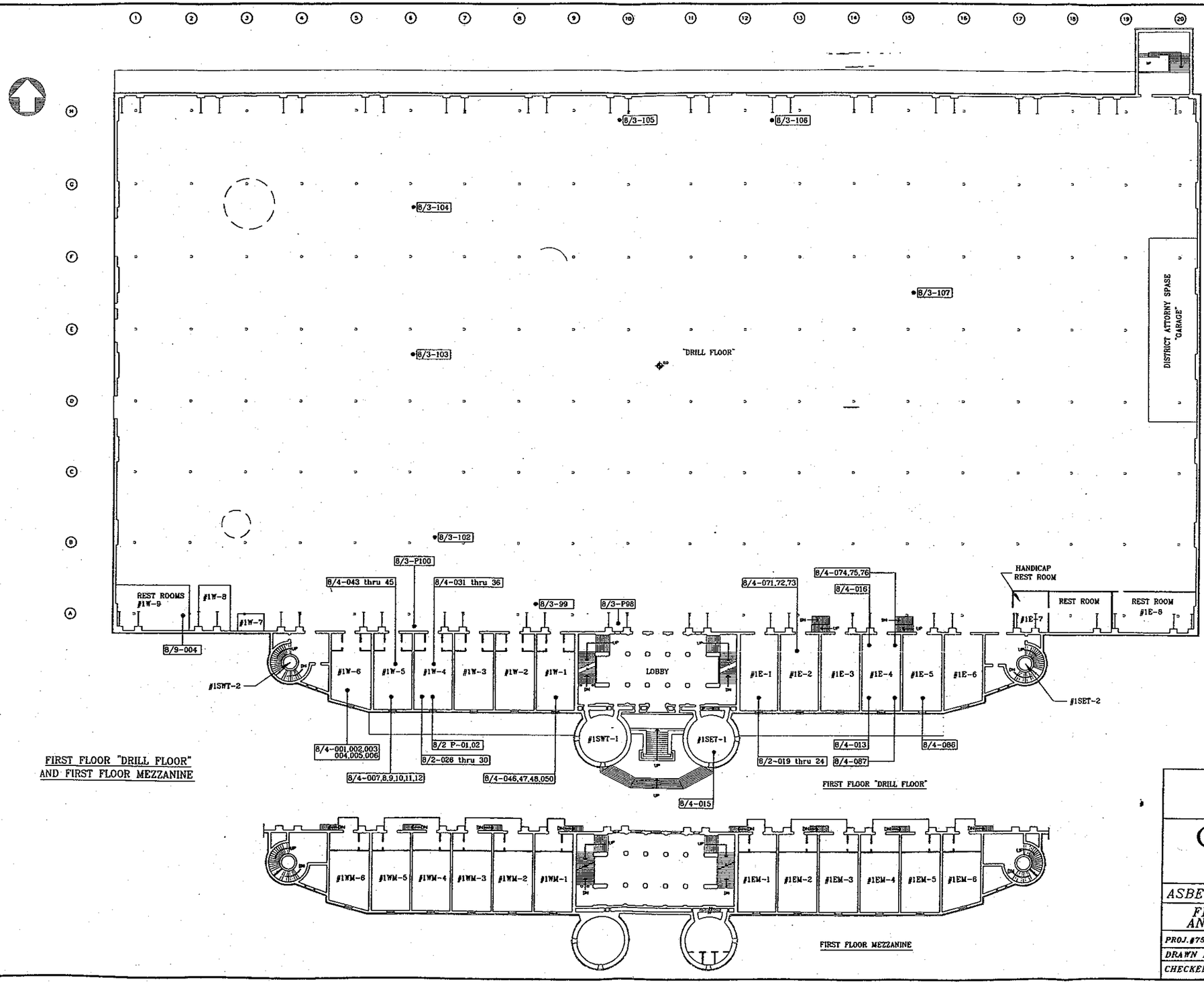
SUB BASEMENT
"BOILER ROOM"

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ASBESTOS BULK SAMPLE LOCATIONS
BASEMENT AND SUB BASEMENT "BOILER ROOM"

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FIRST FLOOR "DRILL FLOOR"
AND FIRST FLOOR MEZZANINE

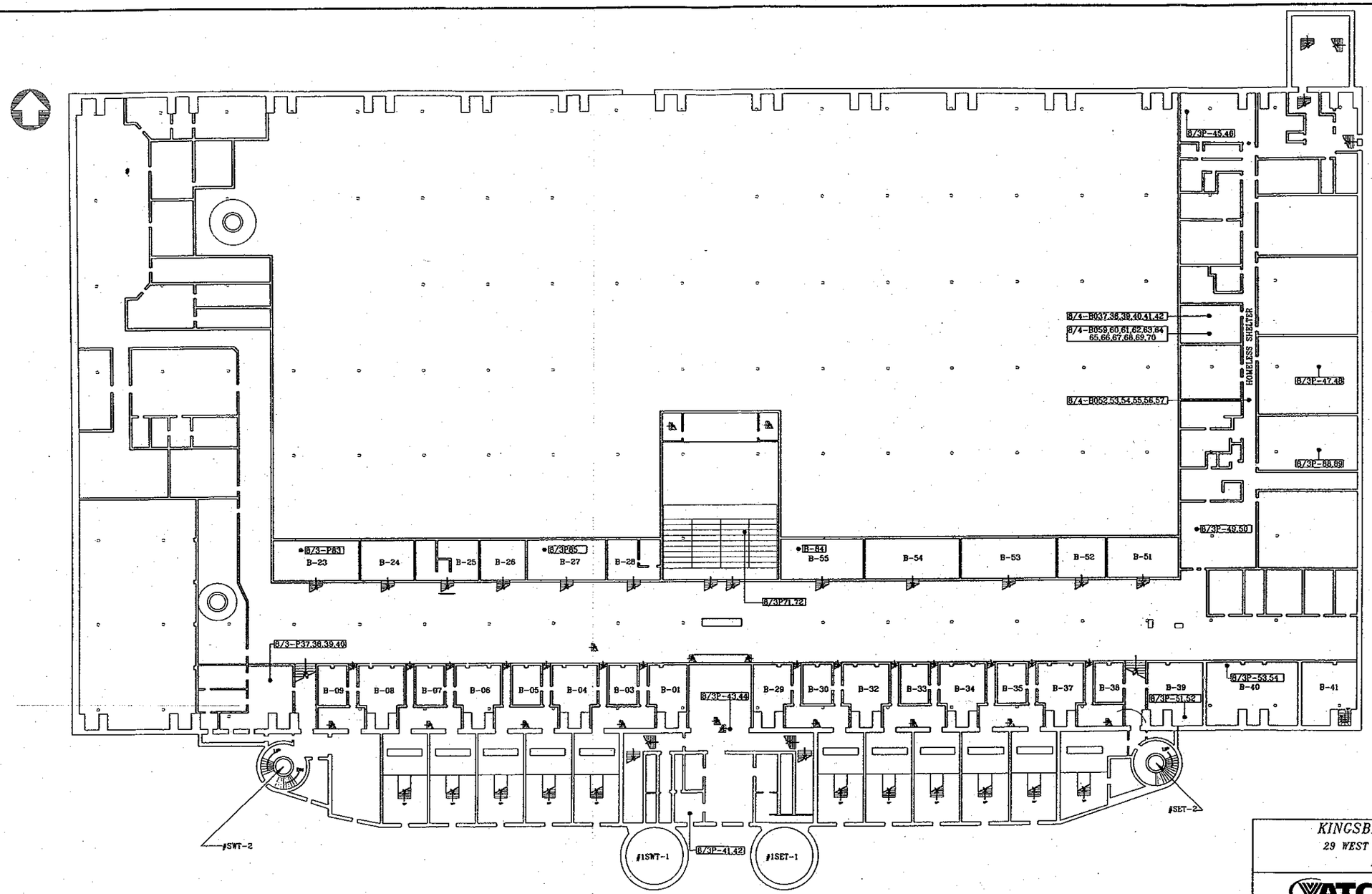
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FIRST FLOOR "DRILL FLOOR"
AND FIRST FLOOR MEZZANINE

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BASEMENT MEZZANINE PLAN

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BRONX, NY

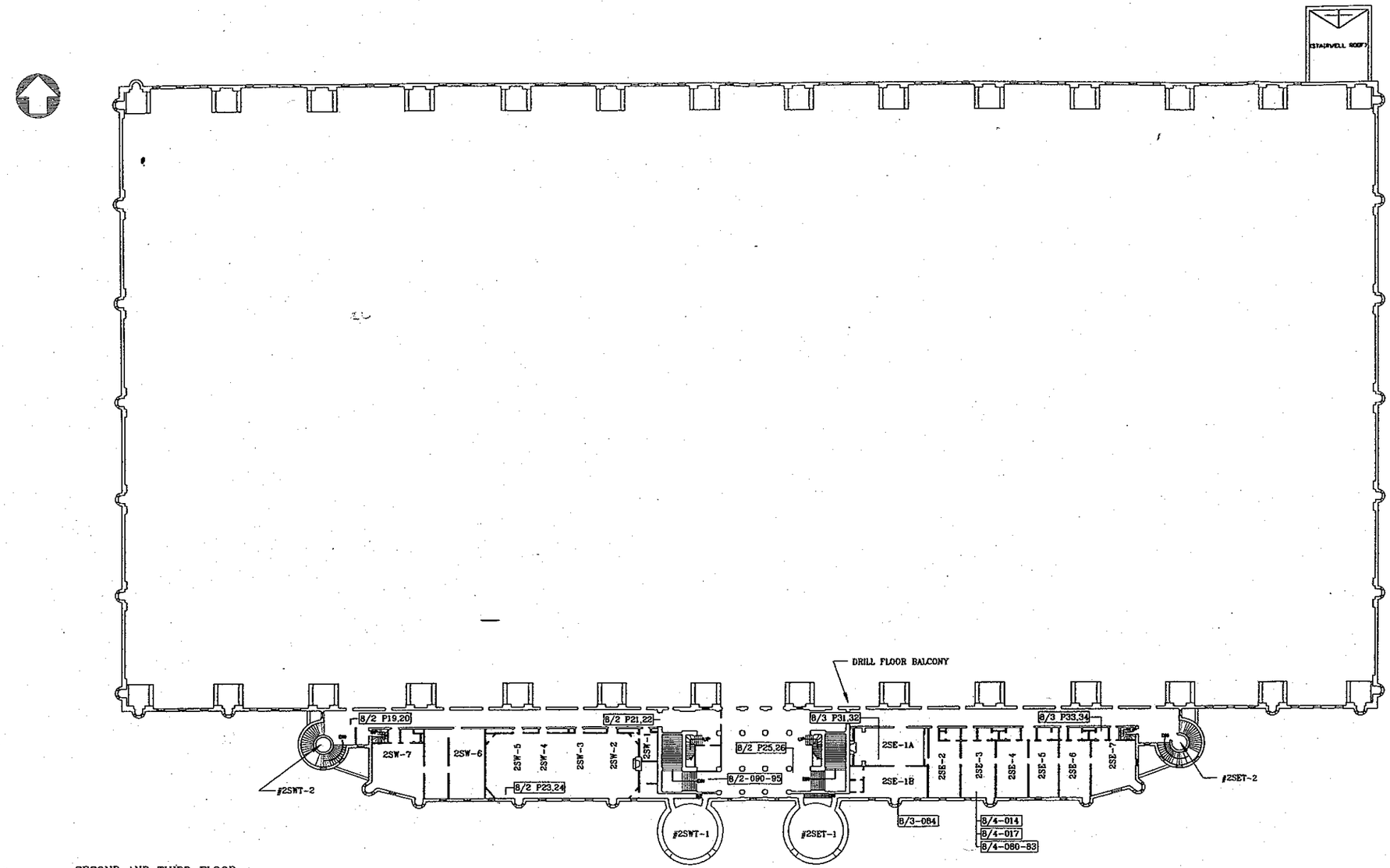
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ASBESTOS BULK SAMPLE LOCATIONS

BASEMENT MEZZANINE PLAN

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SECOND AND THIRD FLOOR

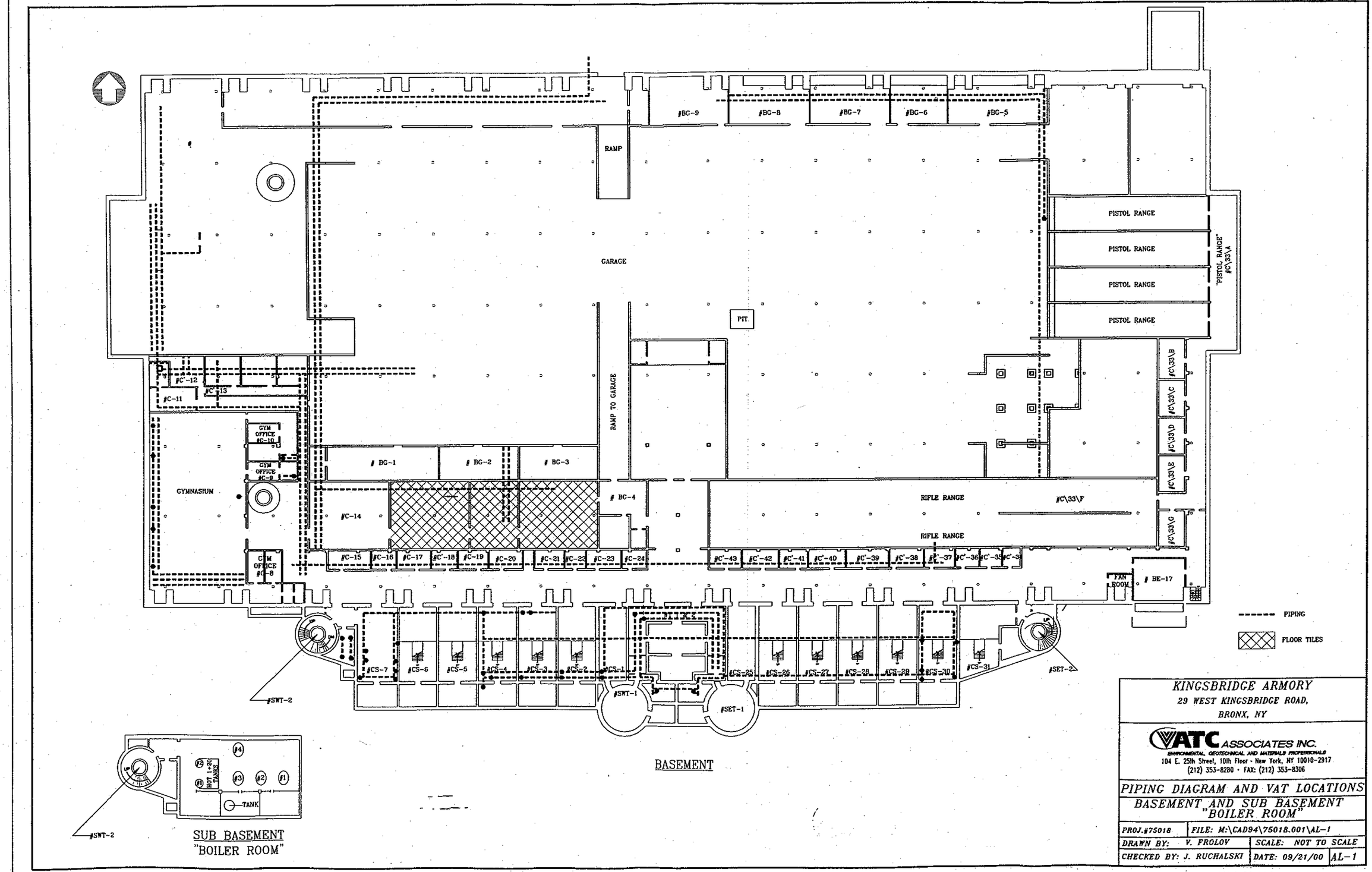
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ASBESTOS BULK SAMPLE LOCATIONS
SECOND AND THIRD FLOOR

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BASEMENT

SUB BASEMENT
"BOILER ROOM"

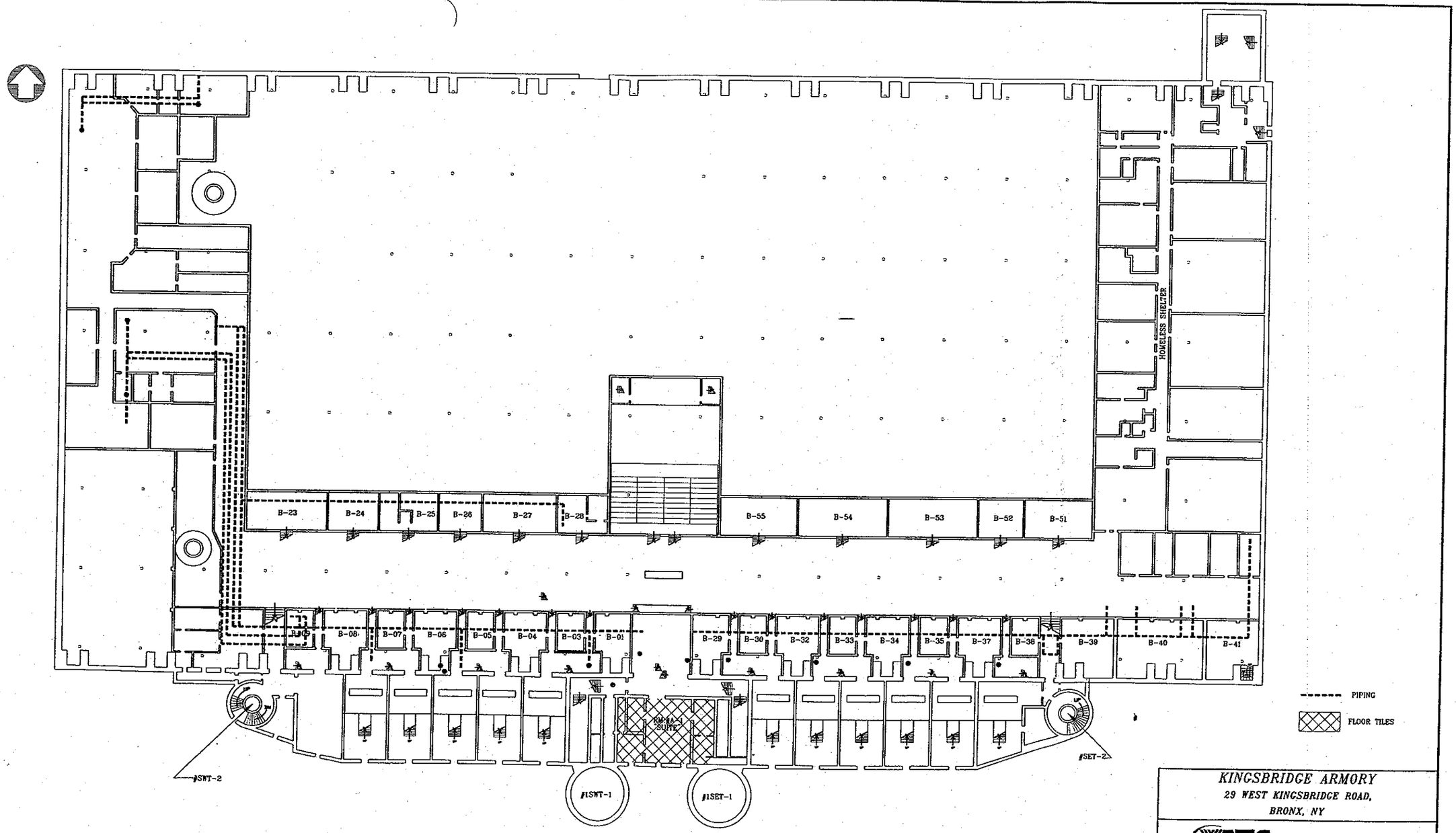
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PIPING DIAGRAM AND VAT LOCATIONS
BASEMENT AND SUB BASEMENT "BOILER ROOM"

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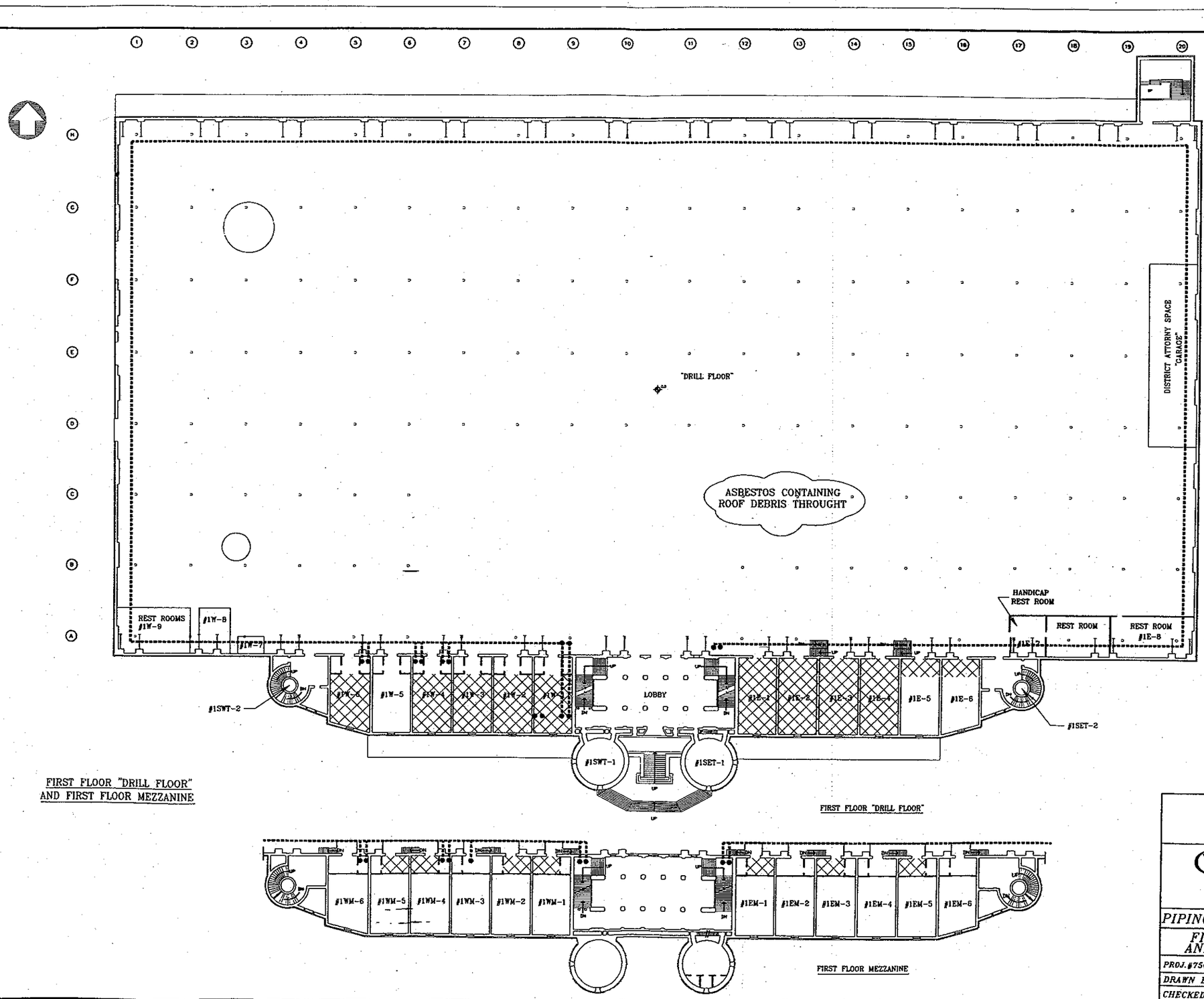


BASEMENT MEZZANINE PLAN

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PIPING DIAGRAM AND VAT LOCATIONS
BASEMENT MEZZANINE PLAN



FIRST FLOOR "DRILL FLOOR"
AND FIRST FLOOR MEZZANINE

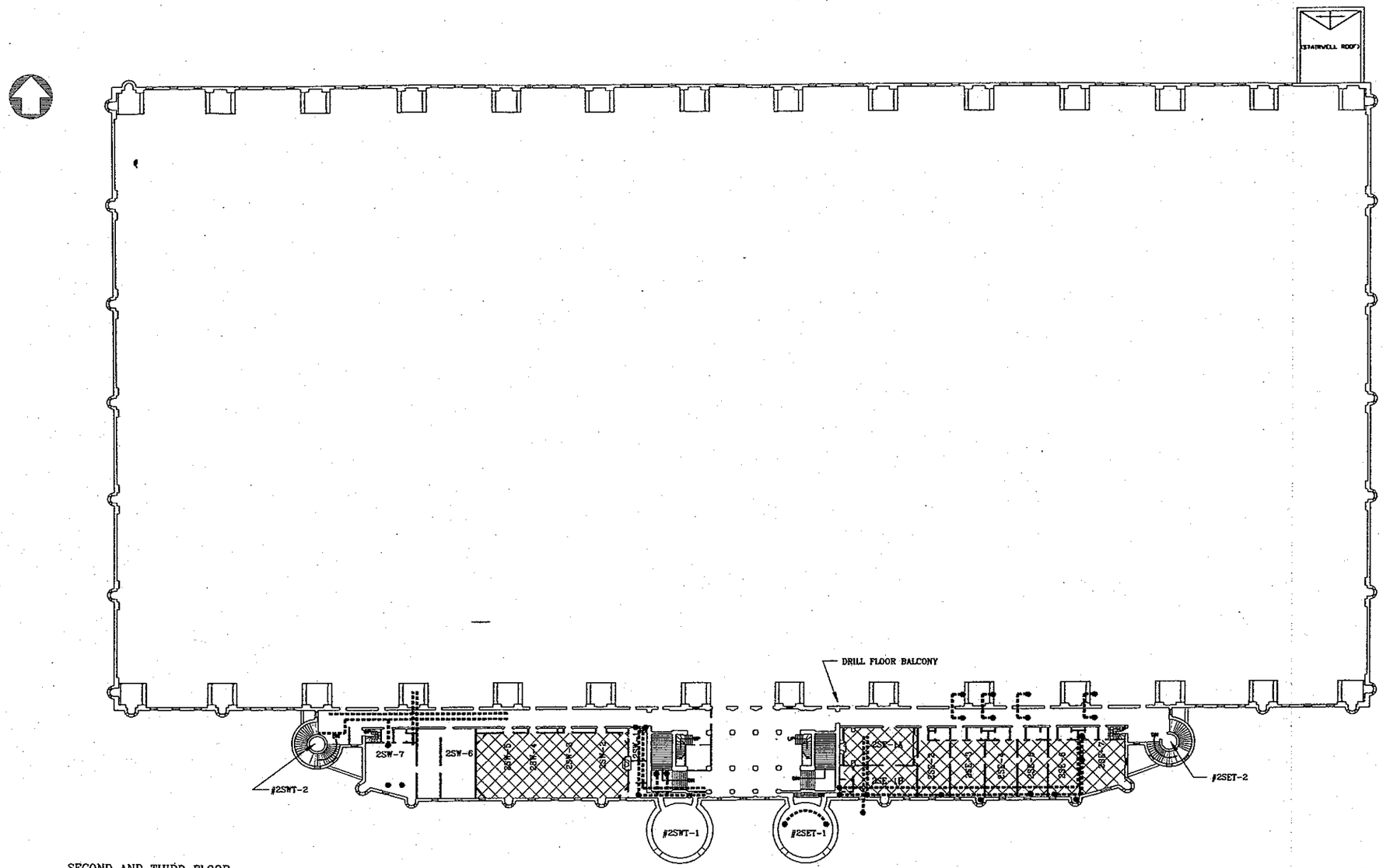
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PIPING DIAGRAM AND VAT LOCATIONS
FIRST FLOOR "DRILL FLOOR"
AND FIRST FLOOR MEZZANINE

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SECOND AND THIRD FLOOR

PIPING

FLOOR TILES

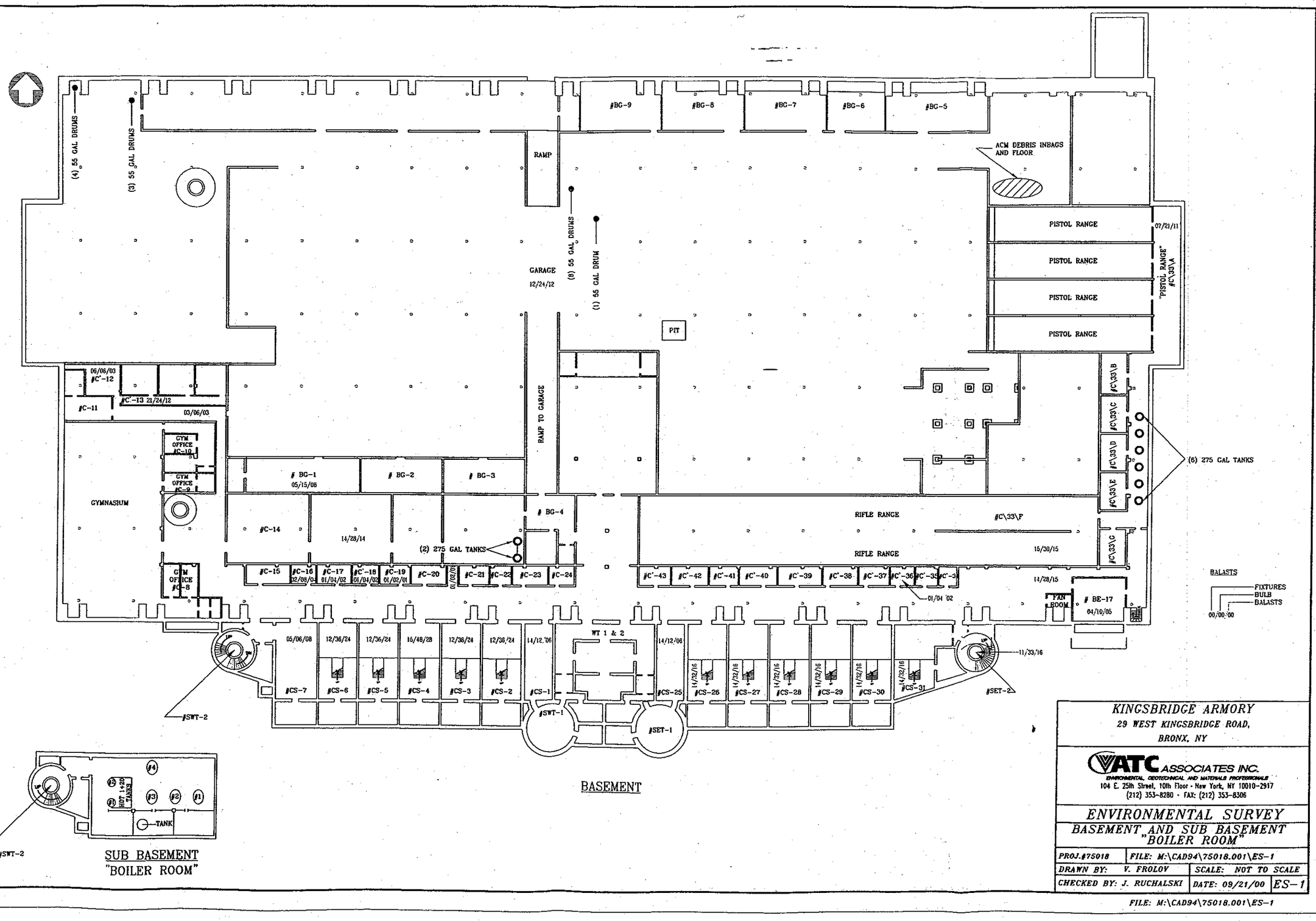
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PIPING DIAGRAM AND VAT LOCATIONS
SECOND AND THIRD FLOOR

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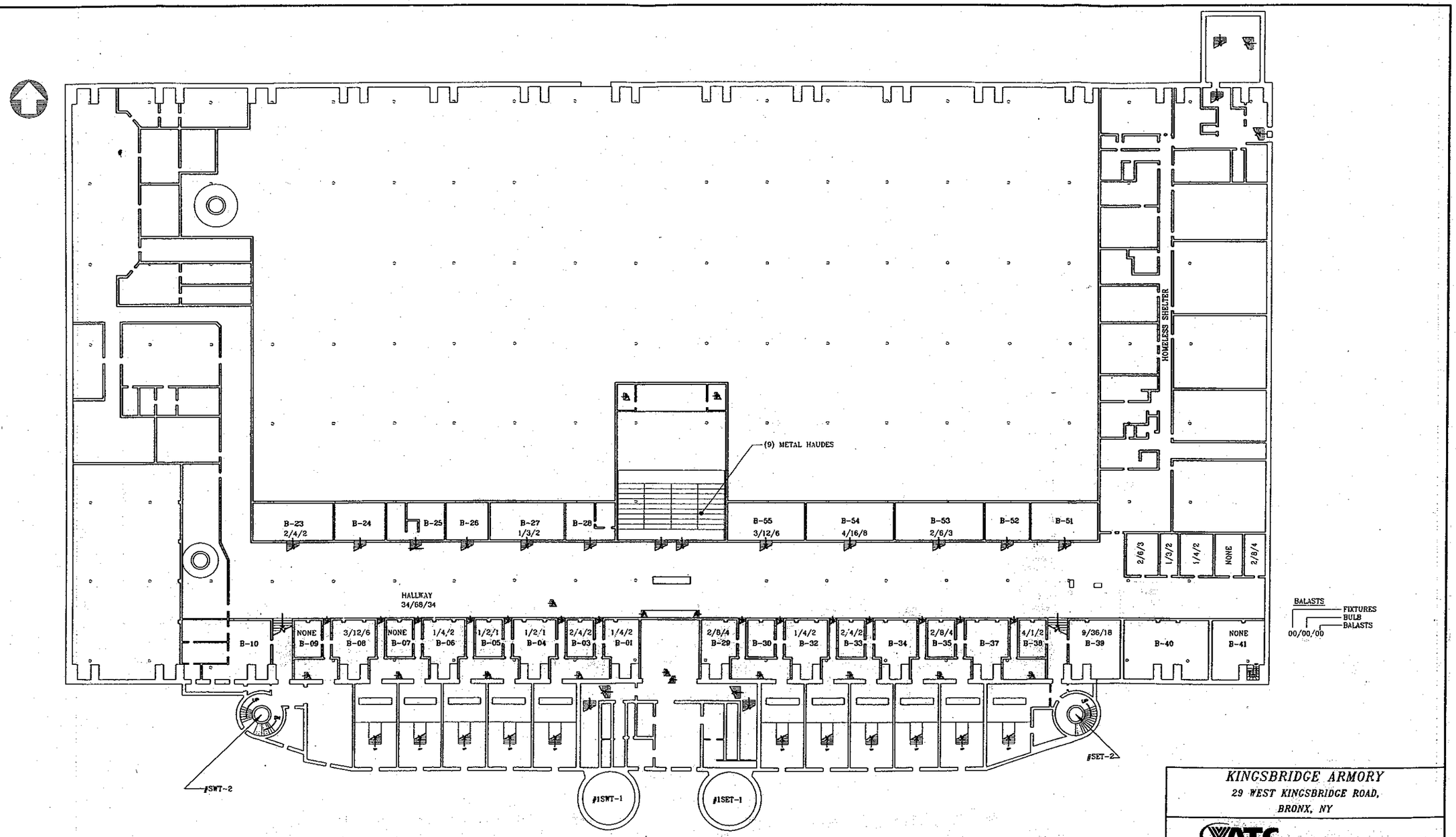
KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

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ENVIRONMENTAL SURVEY
BASEMENT AND SUB BASEMENT "BOILER ROOM"

PROJ.#75018	FILE: M:\CAD94\75018.001\ES-1	
DRAWN BY: V. FROLOV	SCALE: NOT TO SCALE	
CHECKED BY: J. RUCHALSKI	DATE: 09/21/00	ES-1

FILE: M:\CAD94\75018.001\ES-1



BASEMENT MEZZANINE PLAN

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

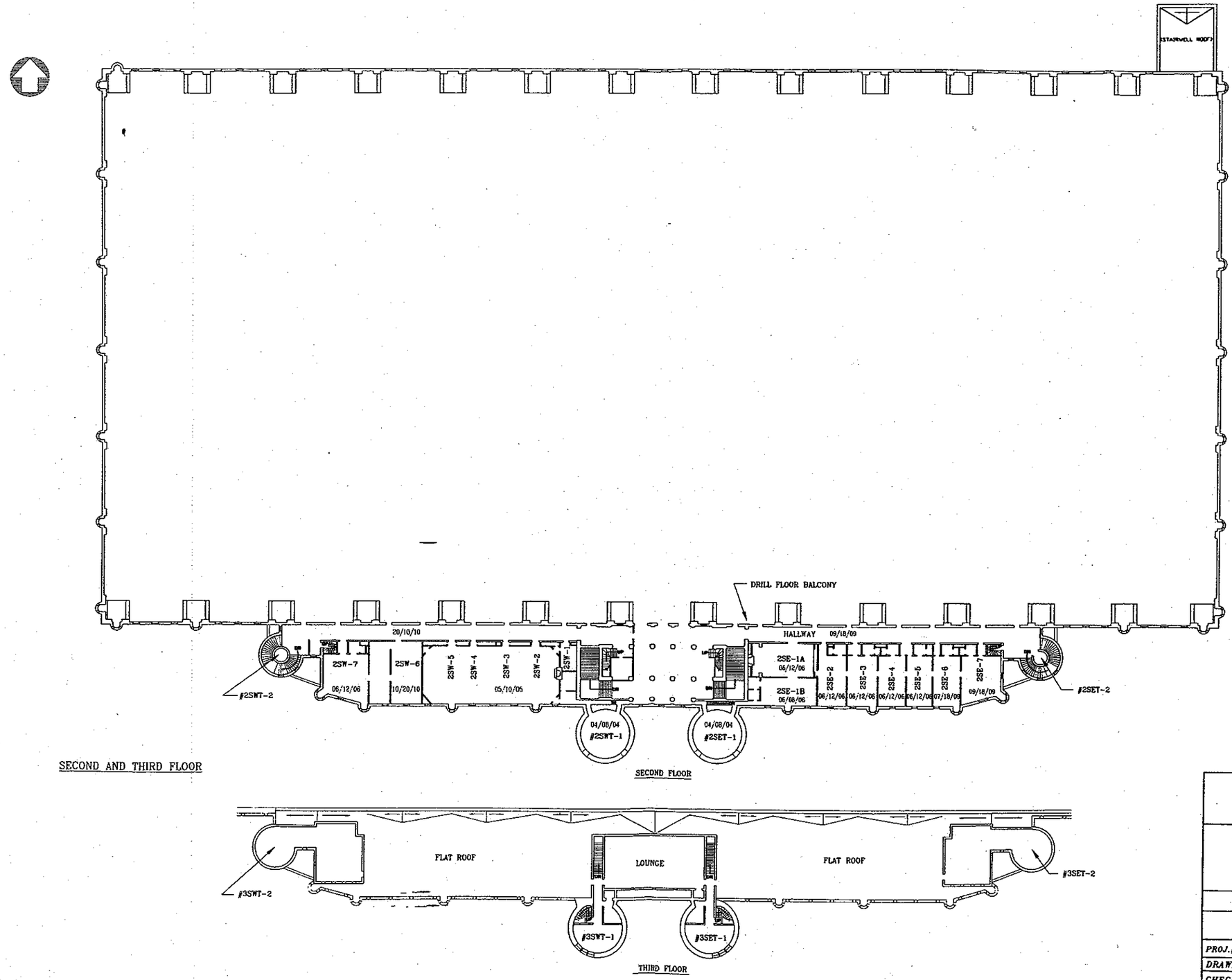
VATC ASSOCIATES INC.
ENVIRONMENTAL, GEOTECHNICAL AND MATERIALS PROFESSIONALS
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ENVIRONMENTAL SURVEY

BASEMENT MEZZANINE PLAN

PROJ.#75018	FILE: M:\CAD94\75018.001\ES-2	
DRAWN BY: V. MOLCHANENKO	SCALE: NOT TO SCALE	
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SECOND AND THIRD FLOOR

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

VATC ASSOCIATES INC.
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ENVIRONMENTAL SURVEY

SECOND AND THIRD FLOOR

PROJ.#75018	FILE: M:\CAD94\75018.001\ES-4	
DRAWN BY: V.MOLCHANENKO	SCALE: NOT TO SCALE	
CHECKED BY: J. RUCHALSKI	DATE: 09/21/00	ES-4

FILE: M:\CAD94\75018.001\ES-4

APPENDIX E:
XRF SURVEY DATA AND BULK SAMPLES

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	1	Calibrate						1.9		
7/24	2	Calibrate						1.7	Avg. 1.8	
7/24	3	Calibrate						1.8		
7/24	4	Boiler room	Wall	1	Concrete	White	Poor	>9.9	Positive	
7/24	5	Basement	Wall	2	Concrete	Grey	Poor	0.4		
7/24	6	Basement	Wall	3	Brick	Grey	Poor	7.1	Positive	
7/24	7	Basement	Wall	3	Concrete	White	Poor	0.5		
7/24	8	Basement	Wall	4	Concrete	Grey	Poor	8.5	Positive	
7/24	9	Basement	Column	6	Concrete	White	Poor	4.5	Positive	
7/24	10	Basement	Boiler units	6	Metal	Grey	Fair	0.0		
7/24	11	Basement	Hot water heater	1	Metal	Brown	Fair	0.4		
7/24	12	Basement	Horizontal duct	5	Metal	Grey	Fair	0.0		
7/24	13	Basement	Ceiling	5	Concrete	Grey	Poor	2.9	Positive	
7/24	14	Basement	Hand rail	2	Metal	Grey	Fair	0.4		
7/24	15	Basement	Stair tread	2	Metal	Grey	Poor	1.0	Positive	Negative
7/24	16	R#1	Wall	1	Concrete	White	Poor	-0.0		
7/24	17	R#1	Wall	3	Concrete	White	Poor	0.3		
7/24	18	R#1	Ceiling	5	Concrete	Grey	Poor	0.0		
7/24	19	R#2	Wall	1	Brick	White	Poor	0.1		
7/24	20	R#2	Wall	1	Concrete	White	Poor	0.2		
7/24	21	R#2	Wall	2	Concrete	White	Poor	-0.1		
7/24	22	R#2	Wall	3	Brick	Grey	Poor	>9.9	Positive	
7/24	23	R#2	Wall	4	Brick	White	Poor	-0.1		
7/24	24	R#2	Door	2	Metal	Grey	Poor	>9.9	Positive	

Tab. 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	25	R#2	Control panel	3	Metal	Grey	Poor	1.0		Negative
7/24	26	R#3	Door	1	Metal	Green	Poor	5.3	Positive	
7/24	27	R#3	Wall	1	Brick	White	Poor	-0.1		
7/24	28	R#3	Wall	2	Brick	White	Poor	-0.2		
7/24	29	R#3	Wall	3	Concrete	White	Poor	-0.1		
7/24	30	R#3	Wall	4	Concrete	White	Poor	-0.1		
7/24	31	R#3	Control panel	2	Metal	Green	Poor	0.0		
7/24	32	R#3	Cabin	1	Metal	Grey	Poor	0.5		
7/24	33	Boiler room	Door	4	Metal	Grey	Poor	>9.9	Positive	
7/24	34	R#4	Door	1	Metal	Grey	Poor	5.6	Positive	
7/24	35	R#4	Wall	1	Concrete	Grey	Poor	0.3		
7/24	36	R#4	Wall	2	Concrete	Grey	Poor	0.1		
7/24	37	R#4	Wall	3	Concrete	Grey	Poor	0.3		
7/24	38	R#4	Wall	4	Concrete	Grey	Poor	0.2		
7/24	39	R#5	Roof	1	Metal	Grey	Poor	>9.9	Positive	
7/24	40	R#5	Wall	1	Brick	Grey	Poor	-0.2		
7/24	41	R#5	Wall	2	Brick	Grey	Poor	-0.1		
7/24	42	R#5	Wall	3	Concrete	Grey	Poor	0.1		
7/24	43	R#5	Wall	4	Concrete	Grey	Poor	0.4		
7/24	44	R#5	Horizontal pipe	6	Metal	Grey	Fair	1.4	Positive	
7/24	45	R#5	Pipe riser	6	Metal	Grey	Fair	0.7		
7/24	46	R#5	Gas booster	6	Metal	Blue	Fair	-0.1		
7/24	47	R#6	Door	1	Metal	Grey	Poor	>9.9	Positive	
7/24	48	R#6	Wall	1	Concrete	Grey	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	49	R#6	Wall	2	Concrete	Grey	Poor	0.0		
7/24	50	R#6	Wall	3	Concrete	White	Poor	-0.2		
7/24	51	R#6	Wall	4	Concrete	Grey	Poor	-0.0		
7/24	52	R#6	Wall	1	Concrete	White	Poor	0.4		
7/24	53	R#6	Wall	2	Concrete	Grey	Poor	7.9	Positive	
7/24	54	R#6	Wall	3	Concrete	White	Poor	-0.1		
7/24	55	R#6	Wall	4	Concrete	Grey	Poor	>9.9	Positive	
7/24	56	R#6	Door	1	Metal	Grey	Poor	0.1		
7/24	57	R#6	Door case	1	Metal	Grey	Poor	-0.1		
7/24	58	Staircase	Wall	2	Brick	White	Fair	3.6	Positive	
7/24	59	Staircase	Wall	3	Brick	Grey	Fair	>9.9	Positive	
7/24	60	Staircase	Wall	4	Brick	Grey	Fair	2.0	Positive	
7/24	61	Staircase	Stair tread	6	Concrete	Grey	Poor	0.0		
7/24	62	Staircase	Stair riser	6	Concrete	Grey	Poor	0.1		
7/24	63	Staircase	Stringer	6	Concrete	Grey	Poor	-0.2		
7/24	64	Staircase	Hand rail	6	Brick	Grey	Poor	3.0	Positive	
7/24	65	Corridor	Wall	1	Brick	White	Poor	6.7	Positive	
7/24	66	Mezzanine	Wall	2	Brick	Grey	Poor	7.3	Positive	
7/24	67	Basement	Wall	3	Brick	White	Poor	0.2	Positive	
7/24	68	Basement	Wall	3	Concrete	Grey	Poor	0.2		
7/24	69	Basement	Wall	4	Brick	White	Poor	5.2	Positive	
7/24	70	R#1	Door	1	Wood	Green	Poor	0.5		
7/24	71	SWTC	Door case	1	Wood	Green	Poor	0.3		
7/24	72	SWTC	Door case	1	Brick	Blue	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	73	SWTC	Door case	2	Brick	Blue	Poor	0.1		
7/24	74	SWTC	Door case	3	Concrete	Blue	Poor	1.5	Positive	
7/24	75	R#1	Wall	4	Brick	Blue	Poor	0.5		
7/24	76	SWTC	Pipe riser	2	Metal	Blue	Poor	0.3		
7/24	77	R#2	Door	1	Metal	Blue	Poor	1.4	Positive	
7/24	78	SWTC	Door case	1	Metal	Blue	Poor	1.7	Positive	
7/24	79	SWTC	Wall	1	Brick	Blue	Poor	>9.9	Positive	
7/24	80	SWTC	Wall	2	Brick	Blue	Poor	>9.9	Positive	
7/24	81	SWTC	Wall	3	Brick	Blue	Poor	>9.9	Positive	
7/24	82	SWTC	Wall	4	Brick	Blue	Poor	>9.9	Positive	
7/24	83	SWTC	Pipe riser	4	Metal	Blue	Poor	2.4	Positive	
7/24	84	SWTC	Window sash	3	Wood	Blue	Poor	>9.9	Positive	
7/24	85	SWTC	Window sash	3	Wood	Blue	Poor	>9.9	Positive	
7/24	86	SWTC	Window case	3	Wood	Blue	Poor	>9.9	Positive	
7/24	87	SWTC	Window apron	3	Wood	Blue	Poor	>9.9	Positive	
7/24	88	Corridor	Radiator	1	Metal	White	Poor	0.4		
7/24	89	R#4	Door 1	1	Metal	Grey	Poor	1.0	Positive	
7/24	90	C16	Door case	1	Metal	Grey	Poor	1.9	Positive	
7/24	91	C16	Door 2	1	Metal	Grey	Poor	-0.1		
7/24	92	C16	Wall	1	Concrete	Blue	Poor	0.1		
7/24	93	C16	Wall	2	Concrete	Blue	Poor	-0.4		
7/24	94	C16	Wall	3	Brick	Blue	Poor	0.5		
7/24	95	C16	Wall	4	Concrete	Blue	Poor	0.3		
7/24	96	C16	Beam	3	Metal	Blue	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	97	R#5	Door 1	1	Metal	Grey	Poor	4.2	Positive	
7/24	98	C17	Door case	1	Metal	Grey	Poor	-0.2		
7/24	99	C17	Door 2	1	Metal	Grey	Poor	-0.0		
7/24	100	C17	Wall	1	Concrete	White	Poor	-0.1		
7/24	101	C17	Wall	2	Concrete	Grey	Poor	0.1		
7/24	102	C17	Wall	3	Brick	White	Poor	0.3		
7/24	103	C17	Wall	4	Brick	Grey	Poor	0.1		
7/24	104	C17	Beam	3	Metal	White	Poor	>9.9	Positive	
7/24	105	C17	Pipe riser	5	Metal	White	Poor	9.1	Positive	
7/24	106	R#6	Door	1	Metal	Black	Poor	2.2	Positive	
7/24	107	C18	Door case	1	Metal	Grey	Poor	-0.1		
7/24	108	C18	Door case	1	Metal	Grey	Poor	0.3		
7/24	109	C18	Wall	1	Concrete	Grey	Poor	-0.3		
7/24	110	C18	Wall	2	Concrete	White	Poor	0.3		
7/24	111	C18	Wall	3	Brick	Grey	Poor	-0.1		
7/24	112	R#6	Wall	4	Concrete	Grey	Poor	-0.0		
7/24	113	C18	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	114	C18	Pipe	5	Metal	Grey	Poor	7.1	Positive	
7/24	115	C18	Frame	4	Wood	Grey	Poor	0.1		
7/24	116	R#7	Door	1	Metal	Grey	Poor	1.4	Positive	
7/24	117	C19	Door case	1	Metal	Grey	Poor	2.3	Positive	
7/24	118	C19	Door	1	Metal	Grey	Poor	0.0		
7/24	119	C19	Wall	1	Concrete	Grey	Poor	3.7	Positive	
7/24	120	C19	Wall	2	Concrete	Grey	Poor	6.0	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	121	C19	Wall	3	Brick	Grey	Poor	5.1	Positive	
7/24	122	C19	Wall	4	Concrete	Grey	Poor	1.4	Positive	
7/24	123	C19	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	124	C19	Horizontal pipe	5	Metal	Grey	Poor	9.4	Positive	
7/24	125	C19	Shelf	3	Wood	Grey	Poor	-0.1		
7/24	126	C19	Shelf sup.	1	Wood	Grey	Poor	0.3		
7/24	127	Alarm	Gate	1	Metal	Grey	Poor	-0.1		
7/24	128	Control room	Wall	2	Concrete	Grey	Fair	+0.2		
7/24	129	Control room	Wall	3	Brick	Grey	Poor	0.3		
7/24	130	Control room	Wall	4	Concrete	Grey	Fair	-0.0		
7/24	131	Control room	Pipe horizontal	5	Metal	Grey	Poor	>9.9	Positive	
7/24	132	Control room	Control panel	4	Metal	Red	Fair	0.0		
7/24	133	Control room	Beam	3	Metal	White	Poor	>0.0	Positive	
7/24	134	R#8	Door	1	Metal	Grey	Poor	1.4	Positive	
7/24	135	C21	Door case	1	Metal	Grey	Poor	2.4	Positive	
7/24	136	C21	Wall	1	Concrete	White	Poor	2.6	Positive	
7/24	137	C21	Wall	2	Concrete	Grey	Poor	2.4	Positive	
7/24	138	C21	Wall	3	Brick	White	Poor	5.7	Positive	
7/24	139	C21	Wall	4	Concrete	Grey	Poor	0.0		
7/24	140	C21	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	141	C21	Pillar	3	Brick	White	Poor	3.8	Positive	
7/24	142	C21	Pipe horizontal	5	Metal	Grey	Poor	>9.9	Positive	
7/24	143	C21	Floor	6	Concrete	Grey	Poor	0.5		
7/24	144	R#	Door 1	1	Metal	Grey	Poor	1.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	145	C41	Door case	1	Metal	Grey	Poor	3.1	Positive	
7/24	146	C41	Wall	1	Concrete	Grey	Poor	0.4		
7/24	147	C41	Wall	2	Concrete	Grey	Poor	-0.1		
7/24	148	C41	Wall	3	Brick	Grey	Poor	-0.0		
7/24	149	RC41	Wall	4	Concrete	Grey	Poor	-0.1		
7/24	150	RC41	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	151	RC41	Pillar	3	Brick	Grey	Poor	0.1		
7/24	152	RC41	Horizontal pipe	5	Metal	Grey	Poor	>9.9	Positive	
7/24	153	RC41	Door 2	1	Metal	Grey	Poor	-0.1		
7/24	154	RC33E	Door	1	Metal	Grey	Fair	1.4	Positive	
7/24	155	RC33E	Door case	1	Metal	Grey	Fair	2.5	Positive	
7/24	156	RC33E	Wall	3	Brick	White	Poor	0.3		
7/24	157	RC33E	Pipe riser	3	Metal	White	Poor	1.4	Positive	
7/24	158	RC33E	Beam	5	Metal	Beige	Fair	>9.9	Positive	
7/24	159	RC33E	Ceiling	6	Concrete	White	Fair	-0.0		
7/25	1	Calibrate						1.9		
7/25	2	Calibrate						1.7	Avg. 1.8	
7/25	3	Calibrate						1.7		
7/25	4	Office 1	Door	1	Metal	Grey	Poor	0.0		
7/25	5	Basement	Door case	1	Metal	Grey	Poor	-0.1		
7/25	6	Basement	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/25	7	Basement	Wall	2	Plaster	Blue	Poor	>9.9	Positive	
7/25	8	Basement	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/25	9	Basement	Wall	4	Plaster	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	10	Basement	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/25	11	Basement	Partition	2	Wood	Blue	Poor	2.5	Positive	
7/25	12	Basement	Baseboard	2	Wood	Blue	Poor	0.4		
7/25	13	Basement	Radiator	2	Metal	Silver	Poor	0.1		
7/25	14	Basement	Radiator cover	2	Metal	Blue	Poor	0.5		
7/25	15	Basement	Window sill	2	Wood	Blue	Poor	2.4	Positive	
7/25	16	Basement	Window case	2	Wood	Blue	Poor	2.4	Positive	
7/25	17	Basement	Window apron	2	Wood	Blue	Poor	1.6	Positive	
7/25	18	Basement	Pipe	5	Metal	Beige	Poor	>9.9	Positive	
7/25	19	Basement	Partition	3	Wood	White	Poor	1.5	Positive	
7/25	20	Bay area	Wall	1	Brick	Beige	Poor	0.3		
7/25	21	By shelter	Wall	2	Brick	Grey	Poor	8.3	Positive	
7/25	22	By shelter	Wall	3	Brick	Beige	Poor	-0.0		
7/25	23	By shelter	Wall	4	Brick	White	Poor	>9.9	Positive	
7/25	24	By shelter	I-beams	6	Metal	White	Poor	>9.9	Positive	
7/25	25	By shelter	I-beams	6	Metal	Grey	Poor	>9.9	Positive	
7/25	26	By shelter	I-beams	6	Metal	White	Poor	>9.9	Positive	
7/25	27	By shelter	Stair tread	6	Concrete	Grey	Poor	0.0		
7/25	28	By shelter	Stair riser	6	Concrete	Grey	Poor	0.4		
7/25	29	By shelter	Stair tread	6	Wood	Grey	Poor	-0.0		
7/25	30	By shelter	Stair riser	6	Wood	Grey	Poor	0.3		
7/25	31	By shelter	Stair stringer	6	Wood	Grey	Poor	0.2		
7/25	32	By shelter	Column	6	Brick/Concrete	Grey	Poor	>9.9	Positive	
7/25	33	RB7	Door	1	Brick/Concrete	Grey	Poor	4.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	34	RB7	Door case	1	Brick/Concrete	Grey	Poor	5.1	Positive	
7/25	35	RB7	Wall	1	Brick	Grey	Poor	2.6	Positive	
7/25	36	RB7	Wall	2	Concrete	Grey	Poor	9.7	Positive	
7/25	37	RB7	Wall	2	Wood	Grey	Poor	0.0		
7/25	38	RB7	Wall	3	Brick	White	Poor	3.0	Positive	
7/25	39	RB7	Wall	4	Brick	Grey	Poor	4.1	Positive	
7/25	40	RB7	Pillar	3	Brick	Grey	Poor	3.1	Positive	
7/25	41	RB7	Beam	5	Metal	Grey	Poor	7.5	Positive	
7/25	42	RB7	Shelf	1	Wood	Grey	Poor	0.1		
7/25	43	RB7	Shelf support	1	Wood	Grey	Poor	2.8	Positive	
7/25	44	RB7	Floor	6	Concrete	Grey	Poor	1.0	Positive	
7/25	45	RB55	Door	1	Metal	Green	Poor	0.2		
7/25	46	RB55	Door case	1	Metal	Green	Poor	3.7	Positive	
7/25	47	RB55	Wall	1	Brick	White	Poor	-0.0		
7/25	48	RB55	Wall	2	Plaster	Grey	Poor	-0.1		
7/25	49	RB55	Wall	3	Plaster	Grey	Poor	-0.1		
7/25	50	RB55	Wall	4	Wood	Grey	Poor	2.3	Positive	
7/25	51	RB55	Beam	5	Metal	White	Poor	4.3	Positive	
7/25	52	RB55	Shelf	4	Wood	Grey	Poor	0.4		
7/25	53	RB55	Shelf	4	Wood	Grey	Poor	0.6		
7/25	54	B32	Door	1	Metal	Grey	Poor	4.5	Positive	
7/25	55	B32	Door case	1	Metal	Grey	Poor	5.5	Positive	
7/25	56	B32	Wall	1	Brick	Grey	Poor	0.7		
7/25	57	B32	Wall	2	Brick	Grey	Poor	3.7	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	58	B32	Wall	3	Brick	Grey	Poor	-0.0		
7/25	59	B32	Wall	4	Brick	Grey	Poor	4.7	Positive	
7/25	60	B32	Beam	5	Brick	Grey	Poor	6.2	Positive	
7/25	61	B32	Shelf	3	Wood	Grey	Poor	-0.1		
7/25	62	B32	Shelf support	3	Wood	Grey	Poor	0.0		
7/25	63	Balcony	Door	1	Wood	Grey	Poor	0.0		
7/25	64	Lecture hall	Door case	1	Metal	Grey	Poor	0.6		
7/25	65	Lecture hall	Wall	1	Concrete	Grey	Poor	-0.1		
7/25	66	Lecture hall	Wall	2	Concrete	Grey	Poor	0.3		
7/25	67	Lecture hall	Wall	4	Concrete	Grey	Poor	-0.1		
7/25	68	Lecture hall	Stair tread	1	Concrete	Grey	Poor	0.3		
7/25	69	Lecture hall	Stair riser	1	Concrete	Grey	Poor	-0.1		
7/25	70	Lecture hall	Hand rail	2	Metal	Grey	Poor	8.7	Positive	
7/25	71	Lecture hall	Floor	6	Concrete	Grey	Poor	-0.3		
7/25	72	RB13	Door	1	Metal	Green	Poor	0.4		
7/25	73	RB13	Door case	1	Metal	Green	Poor	0.3		
7/25	74	RB13	Wall	1	Brick	White	Poor	1.7	Positive	
7/25	75	RB13	Wall	2	Brick	Green	Poor	2.8	Positive	
7/25	76	RB13	Wall	3	Brick	Green	Poor	3.1	Positive	
7/25	77	RB13	Wall	4	Brick	Green	Poor	2.3	Positive	
7/25	78	RB13	Pipe riser	1	Metal	Green	Poor	2.1	Positive	
7/25	79	RB13	Radiator	3	Metal	Green	Poor	2.3	Positive	
7/25	80	RB13	Floor	6	Concrete	Green	Poor	1.7	Positive	
7/25	81	RB13	Cabinet door	3	Wood	Green	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	82	RB13	Cabinet door case	3	Wood	Green	Poor	0.2		
7/25	83	RB17	Door	1	Metal	Green	Poor	0.5		
7/25	84	RB17	Door case	1	Metal	Green	Poor	2.1	Positive	
7/25	85	RB17	Wall	1	Brick	Green	Poor	-0.1		
7/25	86	RB17	Wall	2	Brick	White	Poor	3.5	Positive	
7/25	87	RB17	Wall	3	Brick	Green	Poor	0.1		
7/25	88	RB17	Wall	4	Brick	White	Poor	0.2		
7/25	89	RB17	Column I-beam	6	Metal	White	Poor	>9.9	Positive	
7/25	90	RB17	Window sill	4	Wood	Green	Poor	0.1		
7/25	91	RB17	Window case	1	Wood	Green	Poor	0.1		
7/25	92	RB17	Window apron	1	Wood	Green	Poor	-0.0		
7/25	93	RB17	Window sash	1	Wood	Green	Poor	0.0		
7/25	94	RB17	Radiator	1	Metal	Silver	Poor	4.8	Positive	
7/25	95	RB17	Pipe riser	6	Metal	Grey	Poor	0.4		
7/25	96	RB17	Floor	6	Concrete	Grey	Poor	0.3		
7/25	97	RB20	Door	1	Metal	Grey	Poor	0.4		
7/25	98	RB20	Door case	1	Metal	Grey	Poor	>9.9	Positive	
7/25	99	RB20	Wall	1	Brick	White	Poor	>9.9	Positive	
7/25	100	RB20	Wall	2	Brick	Grey	Poor	>9.9	Positive	
7/25	101	RB20	Wall	3	Brick	White	Poor	>9.9	Positive	
7/25	102	RB20	Wall	4	Brick	Grey	Poor	>9.9	Positive	
7/25	103	RB20	I-beam	6	Metal	Grey	Poor	>9.9	Positive	
7/25	104	RB20	Shelf	2	Wood	Grey	Poor	0.2		
7/25	105	RB20	Shelf support	2	Wood	Grey	Poor	0.4		

Table
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	106	RB20	Floor	6	Concrete	Grey	Poor	0.5		
7/25	107	Bay #2	Wall	1	Plaster	Grey	Poor	0.0		
7/25	108	Bay #2	Wall	2	Brick	Grey	Poor	0.1		
7/25	109	Bay #2	Wall	3	Concrete	Grey	Poor	0.2		
7/25	110	Bay #2	Wall	4	Plaster	Grey	Poor	0.2		
7/25	111	Bay #2	I-beam	6	Metal	Grey	Poor	-0.1		
7/25	112	Bay #2	Pipe riser	3	Metal	Grey	Poor	2.9	Positive	
7/25	113	Bay #2	Radiator	3	Metal	Grey	Poor	0.1		
7/25	114	Gym	Door	1	Metal	Grey	Poor	2.1	Positive	
7/25	115	Gym	Door case	1	Metal	Grey	Poor	>9.9	Positive	
7/25	116	Gym	Wall	1	Brick	White	Poor	>9.9	Positive	
7/25	117	Gym	Wall	2	Brick	White	Poor	>9.9	Positive	
7/25	118	Gym	Wall	3	Concrete	White	Poor	>9.9	Positive	
7/25	119	Gym	Wall	4	Brick	White	Poor	>9.9	Positive	
7/25	120	Gym	I-beam	6	Metal	White	Poor	>9.9	Positive	
7/25	121	Gym	Pipe riser	3	Metal	White	Poor	0.6		
7/25	122	Gym	Hand rail	1	Metal	White	Poor	1.9	Positive	
7/25	123	Gym	Stair tread	1	Metal	White	Poor	3.5	Positive	
7/25	124	Gym	Newel post	1	Metal	White	Poor	>9.9	Positive	
7/25	125	Gym	Stringer	1	Metal	White	Poor	>9.9	Positive	
7/25	126	RB12	Door	1	Metal	Beige	Poor	0.2		
7/25	127	RB12	Door case	1	Metal	Beige	Poor	2.3	Positive	
7/25	128	RB12	Wall	1	Brick	White	Poor	>9.9	Positive	
7/25	129	RB12	Wall	2	Brick	White	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	130	RB12	Wall	4	Brick	White	Poor	>9.9	Positive	
7/25	131	RB12	Radiator	1	Metal	White	Poor	0.2		
7/25	132	RB12	Grate column	2	Concrete	White	Poor	0.0		
7/25	133	RB12	Guard rail	3	Metal	White	Poor	3.9	Positive	
7/25	134	RB12	Found floor	6	Concrete	Grey	Poor	0.5		
7/25	135	Gym	Door	1	Wood	Brown	Poor	0.3		
7/25	136	Office	Door case	1	Wood	Brown	Poor	0.1		
7/25	137	Area #2	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/25	138	Area #2	Wall	2	Plaster	Blue	Poor	>9.9	Positive	
7/25	139	Area #2	Wall	3	Plaster	Blue	Poor	>9.9	Positive	
7/25	140	Area #2	Wall	4	Plaster	Blue	Poor	>9.9	Positive	
7/25	141	Area #2	Pipe riser	2	Plaster	White	Poor	>9.9	Positive	
7/25	142	Area #2	Pillar	2	Metal	Blue	Poor	>9.9	Positive	
7/25	143	Area #2	Window case	4	Wood	Red	Poor	7.8	Positive	
7/25	144	Area #2	Window apron	4	Wood	Red	Poor	6.5	Positive	
7/25	145	Gym	Wall	1	Brick	White	Poor	0.3		
7/25	146	Foyer area	Wall	2	Brick	Grey	Poor	-0.0		
7/25	147	Foyer area	Wall	3	Brick	White	Poor	-0.1		
7/25	148	Foyer area	Wall	4	Brick	Grey	Poor	-0.0		
7/26	149	Gym	Greate column	2	Concrete	Grey	Poor	>9.9	Positive	
7/26	150	Foyer	I-beam	6	Metal	White	Poor	>9.9	Positive	
7/26	151	Firing range	Door	1	Metal	Beige	Poor	0.3		
7/26	152	Firing range	Door case	1	Metal	Beige	Poor	3.3	Positive	
7/26	153	Firing range	Wall	1	Brick	White	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	154	Firing range	Wall	2	Brick	Brown	Poor	0.1	Negative	
7/26	155	Firing range	Wall	3	Metal	White	Poor	1.8	Positive	
7/26	156	Firing range	Wall	4	Brick	Brown	Poor	-0.0		
7/26	157	Firing range	Duct	5	Metal	Beige	Poor	0.2		
7/26	158	Firing range	Horizontal pipe	5	Metal	Beige	Poor	-0.2		
7/26	159	Firing range	Partition wall	6	Brick	Beige	Poor	0.2		
7/26	160	Firing range	I-beam	6	Metal	Beige	Poor	-0.1		
7/26	161	Firing range	Beam	5	Metal	Beige	Poor	1.5	Positive	
7/26	162	Firing range	Gate	2	Metal	Grey	Poor	-0.1		
7/26	163	Firing range	Compressor	2	Metal	Green	Poor	0.6		
7/26	164	Firing range	Ceiling	5	Concrete	Beige	Fair	-0.0		
7/26	165	Calibrate						1.8		
7/26	166	Calibrate						1.7	Avg. 1.8	
7/26	167	Calibrate						1.8		
7/26	168	Calibrate						1.7		
7/26	169	Calibrate						1.6	Avg. 1.8	
7/26	170	Calibrate						1.7		
7/26	171	Basement	Wall	1	Plaster	Grey/blue	Poor	>9.9	Positive	
7/26	172	Lobby	Wall	2	Plaster	Grey/blue	Poor	0.1		
7/26	173	Mezzanine Area	Wall	3	Plaster	Grey/blue	Poor	>9.9	Positive	
7/26	174	Mezzanine Area	Wall	4	Plaster	Grey/grey	Poor	-0.0		
7/26	175	Mezzanine Area	Ceiling	5	Plaster	Grey/blue	Poor	>9.9	Positive	
7/26	176	Mezzanine Area	Pipe riser	4	Metal	Grey/blue	Poor	>9.9	Positive	
7/26	177	Mezzanine Area	Horizontal pipe	5	Metal	Grey/blue	Poor	1.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	178	Mezzanine Area	Column	6	Plaster	Grey/grey	Poor	>9.9	Positive	
7/26	179	Mezzanine Area	Baseboard	3	Wood	Grey/grey	Poor	1.5	Positive	
7/26	180	Mezzanine Area	Door	1	Wood	Grey/green	Poor	1.6	Positive	
7/26	181	Mezzanine Area	Door case	1	Wood	Grey/green	Poor	1.5	Positive	
7/26	182	Mezzanine Area	Floor	6	Concrete	Grey/grey	Poor	2.1	Positive	
7/26	183	Mezzanine Area	Hand rail	2	Metal	Grey/grey	Poor	7.8	Positive	
7/26	184	Mezzanine Area	Newel post	2	Metal	Grey/grey	Poor	7.6	Positive	
7/26	185	Mezzanine Area	Stair tread	2	Metal	Grey/grey	Poor	3.3	Positive	
7/26	186	Basement	Stair riser	6	Metal	Grey	Poor	5.5	Positive	
7/26	187	Mezzanine lobby	stringer	6	Metal	Grey	Poor	8.0	Positive	
7/26	188	Mezzanine lobby	Beam	1	Metal	Grey	Poor	>9.9	Positive	
7/26	189	RA1	Door	1	Wood	Brown	Poor	0.1		
7/26	190	RA1	Door case	1	Wood	Grey	Poor	1.3	Positive	
7/26	191	RA1	Wall	1	Plaster	Green	Poor	>9.9	Positive	
7/26	192	RA1	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/26	193	RA1	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/26	194	RA1	Wall	4	Plaster	Green	Poor	9.5	Positive	
7/26	195	RA1	Column	6	Plaster	Green	Poor	>9.9	Positive	
7/26	195	RA1	Baseboard	1	Wood	Grey	Poor	-0.1		
7/26	196	RA1	Radiator	3	Metal	Beige	Poor	0.1		
7/26	197	RA1	Window sill	3	Wood	Green	Poor	0.1		
7/26	198	RA1	Window case	3	Wood	Green	Poor	0.0		
7/26	199	RA1	Window apron	3	Wood	Green	Poor	0.0		
7/26	200	RA1	Window sash	3	Wood	Green	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	201	RA1	Beam	5	Plaster	Green	Poor	>9.9	Positive	
7/26	202	RA1	Ceiling	5	Plaster	Green	Poor	>9.9	Positive	
7/26	203	Bsmnt, Staircase A	Door	1	Metal	Green	Poor	1.8	Positive	
7/26	204	Bsmnt, Staircase A	Door case	1	Metal	Green	Poor	1.6	Positive	
7/26	205	Bsmnt, Staircase A	Wall	1	Plaster	Green	Poor	0.1		
7/26	206	Bsmnt, Staircase A	Wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/26	207	Bsmnt, Staircase A	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/26	208	Bsmnt, Staircase A	Wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/26	209	Bsmnt, Staircase A	Radiator cover	2	Metal	Grey	Poor	0.3		
7/26	210	Bsmnt, Staircase A	Radiator	2	Metal	Grey	Poor	1.7	Positive	
7/26	211	Bsmnt, Staircase A	Baseboard	4	Plaster	Grey	Poor	6.6	Positive	
7/26	212	Bsmnt, Staircase A	Ceiling	5	Plaster	Green	Poor	>9.9	Positive	
7/26	213	Bsmnt, Staircase A	Floor	6	Concrete	Grey	Poor	1.0	Positive	
7/26	214	Mezzanine	Wall	1	Brick	White	Poor	3.6	Positive	
7/26	215	Bsmnt, Staircase B	Wall	2	Brick	Grey	Poor	3.9	Positive	
7/26	216	Bsmnt, Staircase B	Wall	3	Brick	White	Poor	2.5	Positive	
7/26	217	Bsmnt, Staircase B	Wall	4	Brick	Grey	Poor	3.9	Positive	
7/26	218	Bsmnt, Staircase B	Hand rail	4	Metal	Grey	Poor	1.6	Positive	
7/26	219	Bsmnt, Staircase B	Stair tread	4	Concrete	Grey	Poor	0		
7/26	220	Bsmnt, Staircase B	Stair riser	4	Concrete	Grey	Poor	0.1		
7/26	221	Bsmnt, Staircase B	Stringer	4	Concrete	Grey	Poor	0.1		
7/26	222	Bsmt, mezzanine staircase B	Floor	6	Concrete	Grey	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	223	Bsmt, mezzanine staircase B	Radiator cover	3	Metal	Grey	Poor	0.2		
7/26	224	Bsmt, mezzanine staircase B	Radiator	3	Metal	Grey	Poor	0.5		
7/26	225	RC'6	Door	1	Metal	Green	Poor	-0.1		
7/26	226	RC'6	Door case	1	Metal	Green	Poor	0.6		
7/26	227	RC'6	Wall	1	Brick	White	Poor	3.7	Positive	
7/26	228	RC'6	Wall	2	Brick	White	Poor	4.1	Positive	
7/26	229	RC'6	Wall	3	Brick	White	Poor	-0.2		
7/26	230	RC'6	Wall	4	Brick	White	Poor	4.8	Positive	
7/26	231	RC'6	Hand rail	6	Metal	Grey	Poor	-0.1		
7/26	232	RC'6	Newel post	6	Metal	Grey	Poor	1.4	Positive	
7/26	233	RC'6	Stair tread	6	Wood	Grey	Poor	-0.1		
7/26	234	RC'6	Stringer	6	Metal	Grey	Poor	0.2		
7/26	235	RC'6	Locker door	2	Metal	Grey	Poor	0.5		
7/26	236	RC'6	Beam	5	Metal	Grey	Poor	6.4	Positive	
7/26	237	RC'6	Floor	6	Wood	Grey	Poor	0.3		
7/26	238	RC'6	Floor	6	Concrete	Grey	Poor	3.4	Positive	
7/26	239	RC16A	Door	1	Wood	Stained	Poor	-0.1		
7/26	240	RC16A	Door case	1	Wood	Red	Poor	3.9	Positive	
7/26	241	RC16A	Wall	1	Brick	Blue	Poor	>9.9	Positive	
7/26	242	RC16A	Wall	2	Brick	Green	Poor	>9.9	Positive	
7/26	243	RC16A	Wall	3	Concrete	Beige	Poor	2.8	Positive	
7/26	244	RC16A	Wall	4	Brick	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	245	RC16A	Pipe riser	3	Metal	Blue	Poor	1.8	Positive	
7/26	246	RC16A	Duct	5	Metal	Blue	Poor	0.2		
7/26	247	RC14	Door	1	Metal	Green	Poor	-0.0		
7/26	248	RC14	Door case	1	Metal	Green	Poor	2.4	Positive	
7/26	249	RC14	Wall	1	Brick	Blue	Poor	3.5	Positive	
7/26	250	RC14	Wall	2	Brick	Blue	Poor	3.2	Positive	
7/26	251	RC14	Wall	3	Brick	Blue	Poor	4.1	Positive	
7/26	252	RC14	Wall	4	Brick	Blue	Poor	4.0	Positive	
7/26	253	RC14	Hand rail	6	Metal	Grey	Poor	0.5		
7/26	254	RC14	Newel post	6	Metal	Grey	Poor	0.2		
7/26	255	RC14	Stair tread	6	Wood	Grey	Poor	0.1		
7/26	256	RC14	Stringer	6	Metal	Grey	Poor	0.2		
7/26	257	RC14	Locker door	2	Metal	Blue	Poor	0.4		
7/26	258	RC14	Beam	5	Metal	Grey	Poor	3.6	Positive	
7/26	259	RC14A	Door	1	Wood	Blue	Poor	0.4		
7/26	260	RC14A	Door case	1	Wood	Blue	Poor	0.3		
7/26	261	RC14A	Wall	1	Brick	White	Poor	6.7	Positive	
7/26	262	RC14A	Wall	2	Brick	White	Poor	>9.9	Positive	
7/26	263	RC14A	Wall	3	Concrete	White	Poor	4.8	Positive	
7/26	264	RC14A	Wall	4	Brick	White	Poor	>9.9	Positive	
7/26	265	RC14A	Pipe riser	3	Metal	White	Poor	0.3		
7/26	266	RC14A	Duct	5	Metal	White	Poor	0.1		
7/26	267	R1-15	Door	1	Metal	Green	Poor	0.2		
7/26	268	R1-15	Door case	1	Metal	Green	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	269	R1-15	Wall	1	Plaster	Beige	Poor	-0.1		
7/26	270	R1-15	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/26	271	R1-15	Wall	3	Plaster	Beige	Poor	4.6	Positive	
7/26	272	R1-15	Wall	4	Plaster	Beige	Poor	3.4	Positive	
7/26	273	R1-15	Baseboard	2	Wood	Grey	Poor	-0.1		
7/26	274	R1-15	Chair rail	4	Wood	Beige	Poor	0.6		
7/26	275	R1-15	Wall molding	3	Wood	Beige	Poor	0.5		
7/26	276	R1-15	Radiator cover	2	Metal	White	Poor	9.1	Positive	
7/26	277	R1-15	Window sill	3	Wood	White	Poor	0.3		
7/26	278	R1-15	Window case	3	Wood	White	Poor	0.3		
7/26	279	R1-15	Window apron	3	Wood	White	Poor	0.3		
7/26	280	R1-15	Partition wall		Wood	Beige	Poor	-0.0		
7/26	281	R1-15	Ceiling	5	Plaster	Blue	Poor	5.3	Positive	
7/26	282	R1-15-A	Locker door	2	Metal	Grey	Poor	1.7	Positive	
7/26	283	R1-15-A	Door	1	Wood	Grey	Poor	3.4	Positive	
7/26	284	R1-15-A	Door case	1	Wood	Grey	Poor	0.4		
7/26	285	R1-15-A	Wall	1	Plaster	Blue	Poor	4.5	Positive	
7/26	286	R1-15-A	Wall	2	Plaster	Blue	Poor	3.8	Positive	
7/26	287	R1-15-A	Wall	3	Plaster	Blue	Poor	5.4	Positive	
7/26	288	R1-15-A	Wall	4	Plaster	Blue	Poor	1.2	Positive	
7/26	289	R1-15-A	Baseboard	2	Wood	Blue	Poor	0.8		
7/26	290	R1-15-A	Chair rail	3	Wood	Blue	Poor	2.5	Positive	
7/26	291	R1-15-A	Ceiling	5	Plaster	Blue	Poor	3.5	Positive	
7/26	292	R1-15-A	Horizontal pipe	5	Metal	Blue	Poor	0.5		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	293	RM1-15	Door	1	Wood	Green	Poor	1.5	Positive	
7/26	294	RM1-15	Door case	1	Wood	Green	Poor	2.1	Positive	
7/26	295	RM1-15	Wall	1	Concrete	White	Poor	2.4	Positive	
7/26	296	RM1-15	Wall	2	Concrete	White	Poor	2.9	Positive	
7/26	297	RM1-15	Wall	3	Concrete	White	Poor	0.2		
7/26	298	RM1-15	Wall	4	Concrete	Peach	Poor	3.3	Positive	
7/26	299	RM1-15	Baseboard	3	Wood	White	Poor	2.5	Positive	
7/26	300	RM1-15	Chair rail	2	Wood	White	Poor	2.2	Positive	
7/26	301	RM1-15	Radiator cover	2	Metal	White	Poor	0.3		
7/26	302	RM1-15	Radiator	2	Metal	White	Poor	0.1		
7/26	303	RM1-15	Window sill	3	Wood	White	Poor	2.2	Positive	
7/26	304	RM1-15	Window case	3	Wood	White	Poor	1.9	Positive	
7/26	305	RM1-15	Window sash	3	Wood	White	Poor	3.1	Positive	
7/26	306	RM1-15	Ceiling	5	Plaster	White	Poor	0.5		
7/26	307	RM1-15	Door	1	Wood	Beige	Poor	1.7	Positive	
7/26	308	RM1-15/Bath	Door case	1	Wood	Beige	Poor	5.2	Positive	
7/26	309	RM1-15/Bath	Wall	1	Plaster	Beige	Poor	4.9	Positive	
7/26	310	RM1-15/Bath	Wall	2	Plaster	Beige	Poor	4.5	Positive	
7/26	311	RM1-15/Bath	Wall	3	Plaster	Beige	Poor	4.7	Positive	
7/26	312	RM1-15/Bath	Wall	4	Plaster	Beige	Poor	0.4		
7/26	313	RM1-15/Bath	Radiator	1	Metal	Beige	Poor	0.7		
7/26	314	RM1-15/Bath	Cabinet door	3	Metal	Beige	Poor	7.3	Positive	
7/26	315	RM1-15/Bath	Horizontal pipe	5	Metal	Beige	Poor	0.5		
7/26	316	RM1-15/Bath	Window sill	4	Wood	Beige	Poor	3.5	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	317	RM1-15/Bath	Window case	4	Wood	Beige	Poor	2.8	Positive	
7/26	318	RM1-15/Bath	Window frame	4	Wood	Beige	Poor	2.8	Positive	
7/26	319	RM1-15/Bath	Ceiling	5	Plaster	Beige	Poor	3.8	Positive	
7/26	320	R1-12	Door	1	Metal	Green	Poor	0.2		
7/26	321	R1-12	Door case	1	Metal	Green	Poor	0.1		
7/26	322	R1-12	Wall	1	Plaster	Beige	Poor	5.0	Positive	
7/26	323	R1-12	Wall	2	Plaster	Beige	Poor	4.9	Positive	
7/26	324	R1-12	Wall	3	Plaster	Beige	Poor	6.3	Positive	
7/26	325	R1-12	Wall	4	Plaster	Beige	Poor	5.0	Positive	
7/26	326	R1-12	Baseboard	4	Wood	Grey	Poor	0.6		
7/26	327	R1-12	Wall molding	2	Wood	Grey	Poor	0.7		
7/26	328	R1-12	Radiator cover	2	Metal	Grey	Poor	1.6	Positive	
7/26	329	R1-12	Radiator	2	Metal	Black	Poor	0.6		
7/26	330	R1-12	Window sill	3	Wood	Grey	Poor	1.0	Positive	
7/26	331	R1-12	Window case	3	Wood	Grey	Poor	0.7		
7/26	332	R1-12	Window apron	3	Wood	Grey	Poor	0.2		
7/26	333	R1-12A	Door	1	Wood	Grey	Poor	2.3	Positive	
7/26	334	R1-12A	Door case	1	Wood	Grey	Poor	2.1	Positive	
7/26	335	R1-12A	Wall	1	Plaster	Beige	Poor	6.8	Positive	
7/26	336	R1-12A	Wall	2	Plaster	Beige	Poor	8.3	Positive	
7/26	337	R1-12A	Wall	3	Plaster	Beige	Poor	8.4	Positive	
7/26	338	R1-12A	Wall	4	Plaster	Beige	Poor	5.8	Positive	
7/26	339	R1-12A	Baseboard	1	Wood	Beige	Poor	7.3	Positive	
7/26	340	R1-12A	Pipe riser	2	Metal	Beige	Poor	7.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	341	R1-12A	Window case	4	Wood	Beige	Poor	0.6		
7/26	342	R1-12A	Window sash	4	Wood	Beige	Poor	2.5	Positive	
7/26	343	R1-12A	Ceiling	5	Plaster	Beige	Poor	3.2	Positive	
7/26	344	R1-12A	Shelf support	2	Wood	Beige	Poor	0.0		
7/26	345	Calibrate						1.9		
7/26	346	Calibrate						1.8	Avg. 1.9	
7/26	347	Calibrate						1.9		
7/26	348	R1-1	Door	1	Metal	Green	Poor	0.2		
7/26	349	R1-1	Door case	1	Metal	Green	Poor	-0.0		
7/26	350	R1-1	Wall	1	Plaster	Beige	Poor	1.0	Positive	
7/26	351	R1-1	Wall	2	Plaster	Beige	Poor	3.4	Positive	
7/26	352	R1-1	Wall	3	Plaster	Beige	Poor	3.4	Positive	
7/26	353	R1-1	Wall	4	Plaster	Beige	Poor	4.3	Positive	
7/26	354	R1-1	Baseboard	2	Wood	Black	Poor	0.5		
7/26	355	R1-1	Wall molding	3	Wood	Beige	Poor	1.0	Positive	
7/26	356	R1-1	Radiator	2	Metal	Beige	Poor	1.5		
7/26	357	R1-1	Window sill	3	Wood	Beige	Poor	0.2		
7/26	358	R1-1	Window case	3	Wood	Beige	Poor	-0.1		
7/26	359	R1-1	Window sash	3	Wood	Beige	Poor	0.2		
7/26	360	R1-1	Ceiling	5	Plaster	Beige	Poor	0.2		
7/26	361	R1-1A	Door	1	Wood	Varnish	Poor	0.1		
7/26	362	R1-1A	Door case	1	Wood	Varnish	Poor	1.0	Positive	
7/26	363	R1-1A	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/26	364	R1-1A	Wall	2	Plaster	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	365	R1-1A	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/26	366	R1-1A	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/26	367	R1-1A	Baseboard	3	Wood	Black	Poor	0.3		
7/26	368	R1-1A	Pipe riser	1	Metal	Beige	Poor	3.6	Positive	
7/26	369	R1-1A	Ceiling	5	Plaster	Beige	Poor	5.1	Positive	
7/26	370	RM1-1	Door	1	Wood	White	Poor	-0.1		
7/26	371	RM1-1	Door case	1	Wood	Green	Poor	-0.1		
7/26	372	RM1-1	Wall	1	Plaster	Beige	Poor	9.5	Positive	
7/26	373	RM1-1	Wall	2	Plaster	Beige	Poor	8.9	Positive	
7/26	374	RM1-1	Wall	3	Plaster	Beige	Poor	8.0	Positive	
7/26	375	RM1-1	Wall	4	Plaster	Beige	Poor	6.8	Positive	
7/26	376	RM1-1	Baseboard	4	Wood	Beige	Poor	1.4	Positive	
7/26	377	RM1-1	Window sill	3	Wood	Green	Poor	0.2		
7/26	378	RM1-1	Window case	3	Wood	Green	Poor	1.0	Positive	
7/26	379	RM1-1	Window sash	3	Wood	Varnish	Poor	5.2	Positive	
7/26	380	RM1-1	Radiator	2	Metal	Green	Poor	0.5		
7/26	381	RM1-1	Ceiling	5	Plaster	Beige	Poor	3.7	Positive	
7/26	382	RM1-1	Pipe riser	1	Metal	Beige	Poor	0.7		
7/26	383	RM1-1	Door	1	Wood	White	Poor	5.9	Positive	
7/26	384	RM1-1/Bath	Door case	1	Wood	Green	Poor	5.2	Positive	
7/26	385	RM1-1/Bath	Wall	1	Plaster	Beige	Poor	9.4	Positive	
7/26	386	RM1-1/Bath	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/26	387	RM1-1/Bath	Wall	3	Plaster	Beige	Poor	9.1	Positive	
7/26	388	RM1-1/Bath	Wall	4	Plaster	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	389	RM1-1/Bath	Radiator	1	Metal	So;ver	Poor	-0.0		
7/26	390	RM1-1/Bath	Cabinet door	3	Metal	Beige	Poor	>9.9	Positive	
7/26	391	RM1-1/Bath	Pipe riser	4	Metal	Black	Poor	1.4	Positive	
7/26	392	RM1-1/Bath	Ceiling	5	Plaster	Beige	Poor	2.2	Positive	
7/26	393	R1-4	Door	1	Metal	Green	Poor	-0.0		
7/26	394	R1-4	Door case	1	Metal	Green	Poor	-0.1		
7/26	395	R1-4	Wall	1	Plaster	Green	Poor	1.6	Positive	
7/26	396	R1-4	Wall	2	Plaster	Beige	Poor	5.0	Positive	
7/26	397	R1-4	Wall	3	Plaster	Beige	Poor	4.6	Positive	
7/26	398	R1-4	Wall	4	Plaster	Beige	Poor	4.1	Positive	
7/26	399	R1-4	Wall	2	Plaster	White	Poor	4.1	Positive	
7/26	400	R1-4	Radiator cover	2	Metal	Silver	Poor	0.4		
7/26	401	R1-4	Radiator	2	Metal	Silver	Poor	0.5		
7/26	402	R1-4	Window sill	3	mw	Black	Poor	2.1	Positive	
7/26	403	R1-4	Window case	3	Wood	Black	Poor	0.1		
7/26	404	R1-4	Window apron	3	Wood	Black	Poor	1.7	Positive	
7/26	405	R1-4	Baseboard	2	Wood	Black	Poor	0.4		
7/26	406	R1-4	Ceiling	5	Plaster	Beige	Poor	0.0		
7/26	407	R1-4B	Door	1	Wood	White	Poor	1.0	Positive	
7/26	408	R1-4B	Door case	1	Wood	White	Poor	1.0	Positive	
7/26	409	R1-4B	Wall	1	Plaster	White	Poor	1.0	Positive	
7/26	410	R1-4B	Wall	2	Plaster	White	Poor	0.3		
7/26	411	R1-4B	Wall	3	Plaster	White	Poor	1.6	Positive	
7/26	412	R1-4B	Wall	4	Plaster	White	Poor	1.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	413	R1-4B	Baseboard	3	Wood	White	Poor	1.0	Positive	
7/26	414	R1-4B	Window sill	2	Wood	White	Poor	0.5		
7/26	415	R1-4B	Window case	2	Wood	White	Poor	0.5		
7/26	416	R1-4B	Window sash	2	Wood	White	Poor	0.5		
7/26	417	R1-4B	Ceiling	5	Plaster	White	Poor	0.6		
7/26	418	R1-4A	Door	1	Wood	Brown	Poor	1.3	Positive	
7/26	419	R1-4A	Door case	1	Wood	Green	Poor	1.0	Positive	
7/26	420	R1-4A	Wall	1	Plaster	Red	Poor	1.6	Positive	
7/26	421	R1-4A	Wall	2	Plaster	Red	Poor	2.0	Positive	
7/26	422	R1-4A	Wall	3	Plaster	Red	Poor	2.1	Positive	
7/26	423	R1-4A	Wall	4	Plaster	Red	Poor	0.1		
7/26	424	R1-4A	Baseboard	3	Wood	Red	Poor	2.0	Positive	
7/26	425	R1-4A	Chair rail	2	Wood	Red	Poor	0.6		
7/26	426	R1-4A	Window case	4	Wood	Brown	Poor	0.6		
7/26	427	R1-4A	Window sash	4	Wood	Brown	Poor	0.6		
7/26	428	R1-4A	Horizontal pipe	5	Metal	White	Poor	1.5	Positive	
7/26	429	R1-4A	Ceiling	5	Plaster	White	Poor	0.4		
7/26	430	R1-9	Door	1	Wood	Beige	Poor	0.2		
7/26	431	Ladies room	Door case	1	Wood	Green	Poor	0.0		
7/26	432	Ladies room	Wall	1	Concrete	Beige	Poor	-0.0		
7/26	433	Ladies room	Wall	2	Concrete	Beige	Poor	0.3		
7/26	434	Ladies room	Wall	3	Concrete	Beige	Poor	0.0		
7/26	435	Ladies room	Wall	4	Concrete	Beige	Poor	0.0		
7/26	436	Ladies room	Radiator	3	Metal	Beige	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	437	Ladies room	Door case	3	Metal	Beige	Poor	-0.0		
7/26	438	Ladies room	Radiator cover	1	Metal	Beige	Poor	-0.1		
7/26	439	Ladies room	Pipe riser	3	Metal	Beige	Poor	6.8	Positive	
7/26	440	Ladies room	Wall	3	Brick	Beige	Poor	-0.0		
7/26	441	Calibrate						1.9		
7/26	442	Calibrate						1.8	Avg 1.9	
7/26	443	Calibrate						1.8		
7/27	444	Calibrate						1.8		
7/27	445	Calibrate						1.8		
7/27	446	Calibrate						1.8		
7/27	447	East tower office	Door	1	Wood	Brown	Poor	0.1		
7/27	448	East tower office	Door case	1	Wood	Brown	Poor	0.1		
7/27	449	East tower office	Upper wall	1	Plaster	Lylac	Poor	>9.9	Positive	
7/27	450	East tower office	Upper wall	2	Plaster	Lylac	Poor	>9.9	Positive	
7/27	451	East tower office	Upper wall	3	Plaster	Lylac	Poor	>9.9	Positive	
7/27	452	East tower office	Upper wall	4	Plaster	Lylac	Poor	>9.9	Positive	
7/27	453	East tower office	Lower wall	1	Plaster	Brown	Poor	>9.9	Positive	
7/27	454	East tower office	Lower wall	2	Plaster	Brown	Poor	>9.9	Positive	
7/27	455	East tower office	Lower wall	3	Plaster	Brown	Poor	>9.9	Positive	
7/27	456	East tower office	Lower wall	4	Plaster	Brown	Poor	>9.9	Positive	
7/27	457	East tower office	Baseboard	3	Wood	Brown	Poor	3.2	Positive	
7/27	458	East tower office	Chair rail	2	Wood	Brown	Poor	0.1		
7/27	459	East tower office	Radiator cover	2	Metal	Brown	Poor	>9.9	Positive	
7/27	460	East tower office	Radiator	2	Metal	Brown	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	461	East tower office	Horizontal pipe	3	Metal	Brown	Poor	0.2		
7/27	462	East tower office	Window sill	3	Wood	Brown	Poor	0.3		
7/27	463	East tower office	Window case	3	Wood	Brown	Poor	0.2		
7/27	464	East tower office	Window apron	3	Wood	Brown	Poor	0.0		
7/27	465	East tower office	Ceiling	5	Plaster	White	Poor	5.7	Positive	
7/27	466	Corridor to east tower office	Door	1	Wood	Varnish	Poor	0.0		
7/27	467	Corridor to east tower office	Door case	1	Wood	Blue	Poor	0.6		
7/27	468	Corridor to east tower office	Wall	1	Brick	Blue	Poor	-0.1		
7/27	469	Corridor to east tower office	Wall	2	Brick	White	Poor	-0.0		
7/27	470	Corridor to east tower office	Wall	3	Brick	Blue	Poor	0.0		
7/27	471	Corridor to east tower office	Wall	4	Brick	Blue	Poor	-0.0		
7/27	472	Corridor to east tower office	Pipe riser	2	Metal	Blue	Poor	0.6		
7/27	473	Corridor to east tower office	Shelf	3	Wood	Blue	Poor	3.8	Positive	
7/27	474	Corridor to east tower office	Shelf support	2	Wood	Blue	Poor	3.8	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	475	Corridor to east tower office	Window sill	4	Wood	Black	Poor	0.4		
7/27	476	Corridor to east tower office	Window case	4	Wood	Black	Poor	-0.1		
7/27	477	Corridor to east tower office	Window apron	4	Wood	Black	Poor	0.2		
7/27	478	Corridor to east tower office	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/27	479	Corridor to east tower office	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/27	480	Corridor to east tower office	Wall	4	Plaster	Green	Poor	>9.9	Positive	
7/27	481	Corridor to east tower office	Baseboard	4	Wood	Grey	Poor	4.2	Positive	
7/27	482	Corridor to east tower office	Ceiling	5	Plaster	Grey	Poor	>9.9	Positive	
7/27	483	West tower office	Door	1	Wood	Black	Poor	0.2		
7/27	484	West tower office	Door case	1	Wood	Black	Poor	5.2	Positive	
7/27	485	West tower office	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	486	West tower office	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	487	West tower office	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	488	West tower office	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	489	West tower office	Baseboard	2	Wood	Black	Poor	2.4	Positive	
7/27	490	West tower office	Radiator cover	4	Wood	Black	Poor	0.3		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	491	West tower office	Radiator	1	Metal	Silver	Poor	2.0	Positive	
7/27	492	West tower office	Window sill	1	Wood	Beige	Poor	3.1	Positive	
7/27	493	West tower office	Window case	1	Wood	Beige	Poor	2.1	Positive	
7/27	494	West tower office	Window sash	1	Wood	Beige	Poor	2.6	Positive	
7/27	495	West tower office	Window apron	1	Wood	Beige	Poor	2.7	Positive	
7/27	496	West tower office	Wall molding	1	Wood	Beige	Poor	>9.9	Positive	
7/27	497	Office	Door	1	Wood	Grey	Poor	>9.9	Positive	
7/27	498	Office/Bath	Door case	1	Wood	Black	Poor	>9.9	Positive	
7/27	499	Main lobby	Wall	1	Concrete	Beige	Fair	>9.9	Positive	
7/27	500	Main lobby	Wall	2	Concrete	Beige	Fair	>9.9	Positive	
7/27	501	Main lobby	Wall	3	Concrete	Beige	Fair	>9.9	Positive	
7/27	502	Main lobby	Wall	4	Concrete	Beige	Fair	>9.9	Positive	
7/27	503	Main lobby	Column	6	Concrete	Beige	Fair	>9.9	Positive	
7/27	504	Main lobby	Door	1	Metal	Grey	Fair	0.2		
7/27	505	Main lobby	Door case	1	Metal	Grey	Fair	-0.1		
7/27	506	Main lobby	Baseboard	3	Concrete	Grey	Fair	0.7		
7/27	507	Main lobby	Radiator cover	3	Metal	Black	Fair	-0.1		
7/27	508	Main lobby	Radiator	3	Metal	Silver	Fair	0.6		
7/27	509	Main lobby	Window case	3	Wood	Black	Fair	0.0		
7/27	510	Main lobby	Window sash	3	Wood	Black	Fair	-0.1		
7/27	511	Main lobby	Gate	4	Metal	Grey	Fair	>9.9	Positive	
7/27	512	Main lobby	Ceiling	5	Concrete	Beige	Fair	0.1		
7/27	513	Lobby	Column	6	Concrete	White	Fair	>9.9	Positive	
7/27	514	2nd floor corridor	Door	3	Wood	Stained	Fair	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	515	2nd floor corridor	Door case	3	Wood	Stained	Fair	0.2		
7/27	516	2nd floor corridor	Gate	1	Metal	Grey	Poor	0.4		
7/27	517	2nd floor corridor	Gate case	1	Metal	Grey	Poor	-0.1		
7/27	518	2nd floor corridor	Upper wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	519	2nd floor corridor	Upper wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	520	2nd floor corridor	Lower wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/27	521	2nd floor corridor	Lower wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/27	522	2nd floor corridor	Upper wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	523	2nd floor corridor	Upper wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	524	2nd floor corridor	Lower wall	1	Plaster	Grey	Poor	>9.9	Positive	
7/27	525	2nd floor corridor	Lower wall	3	Plaster	Grey	Poor	>9.9	Positive	
7/27	526	2nd floor corridor	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	527	2nd floor corridor	Radiator cover	2	Metal	Grey	Poor	0.3		
7/27	528	2nd floor corridor	Radiator	2	Metal	Silver	Poor	0.3		
7/27	529	2nd floor corridor	Pipe riser	2	Metal	Silver	Poor	0.2		
7/27	530	2nd floor corridor	Baseboard	4	Concrete	Grey	Poor	1.7	Positive	
7/27	531	East officers club	Door	1	Wood	Stained	Fair	-0.2		
7/27	532	East officers club	Door case	1	Wood	Stained	Fair	-0.1		
7/27	533	East officers club	Upper wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	534	East officers club	Upper wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	535	East officers club	Upper wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	536	East officers club	Upper wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	537	East officers club	Lower wall	1	Wood	Stained	Poor	-0.1		
7/27	538	East officers club	Lower wall	2	Wood	Stained	Poor	-0.1		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	539	East officers club	Lower wall	3	Wood	Stained	Poor	0.0		
7/27	540	East officers club	Lower wall	4	Wood	Stained	Poor	-0.0		
7/27	541	East officers club	Column	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	542	East officers club	Wall molding	1	Wood	Beige	Poor	9.3	Positive	
7/27	543	East officers club	Ceiling	5	Plaster	White	Poor	>9.9	Positive	
7/27	544	East officers club	Beam ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	545	2nd fl., office 2-2-6	Door	1	Wood	Stained	Poor	-0.1		
7/27	546	2nd fl., office 2-2-6	Door case	1	Wood	Stained	Poor	-0.0		
7/27	547	2nd fl., office 2-2-6	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	548	2nd fl., office 2-2-6	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	549	2nd fl., office 2-2-6	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	550	2nd fl., office 2-2-6	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	551	2nd fl., office 2-2-6	Baseboard	3	Wood	Beige	Poor	0.2		
7/27	552	2nd fl., office 2-2-6	Radiator cover	3	Metal	Beige	Poor	0.2		
7/27	553	2nd fl., office 2-2-6	Radiator	3	Metal	Beige	Poor	0.0		
7/27	554	2nd fl., office 2-2-6	Window sill	3	Wood	Beige	Poor	0.7		
7/27	555	2nd fl., office 2-2-6	Window case	3	Wood	Beige	Poor	0.6		
7/27	556	2nd fl., office 2-2-6	Window apron	3	Wood	Beige	Poor	-0.1		
7/27	557	2nd fl., office 2-2-6	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	558	2nd fl., office 2-2-6	Door	1	Plaster	Green	Poor	>9.9	Positive	
7/27	559	2nd fl., bath 2-2-6	Door case	1	Wood	Green	Poor	>9.9	Positive	
7/27	560	2nd fl., bath 2-2-6	Wall	1	Wood	Green	Poor	>9.9	Positive	
7/27	561	2nd fl., bath 2-2-6	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/27	562	2nd fl., bath 2-2-6	Wall	3	Plaster	Green	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	563	2nd fl., bath 2-2-6	Wall	4	Plaster	Green	Poor	>9.9	Positive	
7/27	564	2nd fl., bath 2-2-6	Window case	4	Wood	Green	Poor	>9.9	Positive	
7/27	565	2nd fl., bath 2-2-6	Window sash	4	Wood	Green	Poor	>9.9	Positive	
7/27	566	2nd fl., closet 2-2-6	Door	1	Wood	Grey	Poor	>9.9	Positive	
7/27	567	2nd fl., closet 2-2-6	Door case	1	Wood	Grey	Poor	>9.9	Positive	
7/27	568	2nd fl., closet 2-2-6	Wall	1	Plaster	Grey	Poor	>9.9	Positive	
7/27	569	2nd fl., closet 2-2-6	Wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/27	570	2nd fl., closet 2-2-6	Wall	3	Plaster	Grey	Poor	>9.9	Positive	
7/27	571	2nd fl., closet 2-2-6	Wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/27	572	2nd fl., closet 2-2-6	Pipe riser	3	Metal	Grey	Poor	>9.9	Positive	
7/27	573	2nd fl., closet 2-2-6	Shelf	3	Wood	Grey	Poor	>9.9	Positive	
7/27	574	2nd fl., closet 2-2-6	Shelf support	3	Wood	Grey	Poor	>9.9	Positive	
7/27	575	2-2-5	Door	1	Wood	Stained	Poor	-0.2		
7/27	576	2-2-5	Door case	1	Wood	Black	Poor	1.0	Positive	
7/27	577	2-2-5	Baseboard	3	Wood	Black	Poor	-0.1		
7/27	578	2-2-5	Radiator	3	Metal	Black	Poor	0.4		
7/27	579	2-2-5	Window sill	3	Wood	Black	Poor	0.3		
7/27	580	2-2-5	Window case	3	Wood	Black	Poor	0.1		
7/27	581	2-2-5	Window apron	3	Wood	Black	Poor	0.4		
7/27	582	2-2-5	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	583	2-2-5	Pipe riser	3	Metal	Black	Poor	1.5	Positive	
7/27	584	2-2-5	Molding ceiling	5	Wood	Beige	Poor	0.1		
7/27	585	2-2-5	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	586	2nd fl., corridor	Floor	6	Concrete	Grey	Poor	1.5	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	587	West officers club	Door case	1	Wood	Black	Poor	0.1		
7/27	588	West officers club	Wall	1	Plaster	Green	Poor	>9.9	Positive	
7/27	589	West officers club	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/27	590	West officers club	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/27	591	West officers club	Wall	4	Plaster	Green	Poor	>9.9	Positive	
7/27	592	West officers club	Wall molding	1	Wood	White	Poor	>9.9	Positive	
7/27	593	West officers club	Fire place	2	Brick	Beige	Fair	-0.0		
7/27	594	West officers club	Ceiling	5	Plaster	White	Fair	>9.9	Positive	
7/27	595	West officers club	Door	1	Wood	White	Fair	>9.9	Positive	
7/27	596	East stairs to 3rd fl.	Hand rail	1	Metal	Green/black	Poor	>9.9	Positive	
7/27	597	East stairs to 3rd fl.	Newel post	1	Metal	Green/black	Poor	>9.9	Positive	
7/27	598	East stairs to 3rd fl.	Ballust	1	Metal	Green/black	Poor	>9.9	Positive	
7/27	599	East stairs to 3rd fl.	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	600	East stairs to 3rd fl.	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	601	East stairs to 3rd fl.	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	602	East stairs to 3rd fl.	Wall	4	Plaster	Beige	Poor	5.9	Positive	
7/27	603	East stairs to 3rd fl.	Ceiling	5	Plaster	Grey	Poor	>9.9	Positive	
7/27	604	East stairs to 3rd fl.	Baseboard	2	Wood	Beige	Poor	>9.9	Positive	
7/27	605	East stairs to 3rd fl.	Door	4	Metal	Beige	Poor	>9.9	Positive	
7/27	606	East stairs to 3rd fl.	Door case	4	Metal	Beige	Poor	>9.9	Positive	
7/27	607	3rd fl., officers lounge	Door case	1	Wood	Blue	Poor	>9.9	Positive	
7/27	608	3rd fl., officers lounge	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/27	609	3rd fl., officers lounge	Wall	2	Plaster	Blue	Poor	>9.9	Positive	
7/27	610	3rd fl., officers lounge	Wall	3	Plaster	Blue	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	611	3rd fl., officers lounge	Wall	4	Plaster	Blue	Poor	>9.9	Positive	
7/27	612	3rd fl., officers lounge	Baseboard	2	Wood	Black	Poor	>9.9	Positive	
7/27	613	3rd fl., officers lounge	Radiator	4	Metal	Blue	Poor	1.9	Positive	
7/27	614	3rd fl., officers lounge	Window sill	4	Wood	Blue	Poor	>9.9	Positive	
7/27	615	3rd fl., officers lounge	Window apron	4	Wood	Blue	Poor	>9.9	Positive	
7/27	616	3rd fl., officers lounge	Ceiling	5	Plaster	Blue/white	Poor	>9.9	Positive	
7/27	617	3rd fl., officers lounge	Pipe riser	4	Metal	Blue/blue	Poor	>9.9	Positive	
7/27	618	3rd fl., officers lounge	Bar	4	Wood	Varnish	Poor	-0.1		
7/27	619	3rd fl., officers lounge	Wall	1	Plaster	Dark green	Poor	>9.9	Positive	
7/27	620	West stairs to 3rd fl.	Wall	2	Plaster	Dark green	Poor	>9.9	Positive	
7/27	621	West stairs to 3rd fl.	Wall	3	Plaster	Dark green	Poor	>9.9	Positive	
7/27	622	West stairs to 3rd fl.	Wall	4	Plaster	Dark green	Poor	>9.9	Positive	
7/27	623	West stairs to 3rd fl.	Electrical panel	1	Wood	Dark green	Poor	>9.9	Positive	
7/27	624	West stairs to 3rd fl.	Ceiling	5	Plaster	Dark green	Poor	8.3	Positive	
7/27	625	West stairs to 3rd fl.	Baseboard	3	Wood	Dark green	Poor	>9.9	Positive	
7/27	626	West stairs to 3rd fl.	Hand rail	1	Metal	Dark green	Poor	8.0	Positive	
7/27	627	West stairs to 3rd fl.	Newel post	1	Metal	Dark green	Poor	6.3	Positive	
7/27	628	West stairs to 3rd fl.	Baluster	1	Metal	Dark green	Poor	>9.9	Positive	
7/27	629	West Turret	Wall	1	Plaster	Brown	Poor	>9.9	Positive	
7/27	630	West Turret	Wall	2	Plaster	Brown	Poor	>9.9	Positive	
7/27	631	West Turret	Wall	3	Plaster	Brown	Poor	>9.9	Positive	
7/27	632	West Turret	Wall	4	Plaster	Brown	Poor	>9.9	Positive	
7/27	633	West Turret	Ceiling	5	Plaster	Brown	Poor	>9.9	Positive	
7/27	634	West Turret	Pipe riser	4	Metal	Brown	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	635	West Turret	Radiator	4	Metal	Silver	Poor	6.4	Positive	
7/27	636	West Turret	Hand rail	1	Metal	Grey	Poor	>9.9	Positive	
7/27	637	West Turret	Stair tread	1	Metal	Grey	Poor	>9.9	Positive	
7/27	638	West Turret	Stair riser	1	Metal	Grey	Poor	>9.9	Positive	
7/27	639	West Turret	Stringer	1	Metal	Grey	Poor	>9.9	Positive	
7/27	640	Calibrate						1.8		
7/27	641	Calibrate						1.7	Avg. 1.8	
7/27	642	Calibrate						1.8		
7/27	643	East 2, tower apt. living room	Door	1	Wood	Stained	Fair	-0.0		
7/27	644	East 2, tower apt. living room	Door case	1	Wood	Stained	Fair	0.1		
7/27	645	East 2, tower apt. living room	Wall	1	Plaster	Yellow	Poor	>9.9	Positive	
7/27	646	East 2, tower apt. living room	Wall	2	Plaster	Yellow	Poor	1.7	Positive	
7/27	647	East 2, tower apt. living room	Wall	3	Plaster	Yellow	Poor	3.9	Positive	
7/27	648	East 2, tower apt. living room	Wall	4	Plaster	Yellow	Poor	>9.9	Positive	
7/27	649	East 2, tower apt. living room	Baseboard	1	Wood	Grey	Poor	-0.0		
7/27	650	East 2, tower apt. living room	Radiator	3	Metal	Silver	Poor	1.4	Positive	

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XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	651	East 2, tower apt. living room	Window sill	4	Wood	Black	Poor	0.2		
7/27	652	East 2, tower apt. living room	Wall molding	2	Wood	Yellow	Poor	>9.9	Positive	
7/27	653	East 2, tower apt. living room	Shelf	4	Wood	Blue	Poor	1.3	Positive	
7/27	654	East 2, tower apt. living room	Shelf support	4	Wood	Blue	Poor	0.4		
7/27	655	East 2, tower apt. living room	Pipe riser	3	Metal	Silver	Poor	2.5	Positive	
7/27	656	Office	Door	1	Wood	Grey	Poor	>9.9	Positive	
7/27	657	Office	Door case	1	Wood	Grey	Poor	>9.9	Positive	
7/27	658	Office	Wall	1	Plaster	Grey	Poor	>9.9	Positive	
7/27	659	Office	Wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/27	660	Office	Wall	3	Plaster	Grey	Poor	>9.9	Positive	
7/27	661	Office	Wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/27	662	Office	Baseboard	3	Wood	Grey	Poor	>9.9	Positive	
7/27	663	Office	Radiator	4	Metal	Silver	Poor	>9.9	Positive	
7/27	664	Office	Wall	4	Brick	Grey	Poor	-0.0		
7/27	665	Office	Ceiling	5	Plaster	Grey	Poor	>9.9	Positive	
7/27	666	East Turret	living room ceiling	5	Plaster	White	Poor	>9.9	Positive	
7/27	667	East Turret	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/27	668	East Turret	Wall	3	Plaster	Blue	Poor	>9.9	Positive	
7/27	669	East Turret	Wall	3	Plaster	Grey	Poor	>9.9	Positive	

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Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	670	East Turret	Pipe riser	3	Metal	Grey	Poor	2.0	Positive	
7/27	671	East Turret	Window sill	3	Wood	Black	Poor	0.1		
7/27	672	East Turret	Window case	3	Wood	Black	Poor	0.2		
7/27	673	East Turret	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	674	Staircase	Hand rail	3	Metal	Yellow	Poor	>9.9	Positive	
7/27	675	Drill floor	Upper wall	1	Plaster	Beige	Poor	0.1		
7/27	676	Southwest corner	Lower wall	1	Plaster	Green	Poor	1.0	Positive	
7/27	677	Southwest corner	Lower wall	1	Plaster	Brown	Poor	1.5	Positive	
7/27	678	Southwest corner	Window frame	1	Wood	Beige	Poor	3.2	Positive	
7/27	679	Southwest corner	Door	1	Wood	Green	Poor	>9.9	Positive	
7/27	680	Southwest corner	Door case	1	Wood	Green	Poor	>9.9	Positive	
7/27	681	Southwest corner	Window apron	1	Concrete	Green	Poor	1.8	Positive	
7/27	682	Southwest corner	Steel structure upper	1	Metal	Beige	Poor	>9.9	Positive	
7/27	683	Southwest corner	Steel structure lower	1	Metal	Green	Poor	>9.9	Positive	
7/27	684	Southwest corner	Radiator cover	1	Metal	Green	Poor	5.2	Positive	
7/27	685	Southwest corner	Radiator	1	Metal	Silver	Poor	2.8	Positive	
7/27	686	Southwest corner	Upper wall	1	Brick	Beige	Poor	0.2		
7/27	687	Southwest corner	Lower wall	1	Brick	Green	Poor	5.2	Positive	
7/27	688	Southwest corner	Door case	1	Wood	Green	Poor	-0.0		
7/27	689	Southwest corner	Door case	1	Metal	Dark green	Poor	-0.1		
7/27	690	Southwest corner	Pipe riser	1	Metal	White	Poor	5.4	Positive	
7/27	691	Southwest corner	Pipe riser	1	Metal	Green	Poor	>9.9	Positive	
7/27	692	Southwest corner	Upper wall	1	Brick	Red	Poor	-0.0		
7/27	693	Southwest corner	Steel structure	1	Metal	White	Poor	7.0	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	694	Southwest corner	Steel structure	1	Metal	Green	Poor	>9.9	Positive	
7/27	695	Southwest corner	Lower wall	1	Brick	Brown	Poor	5.7	Positive	
7/27	696	Southwest corner	Pipe riser	1	Metal	Brown	Poor	7.9	Positive	
7/27	697	Southwest corner	Radiator cover	1	Metal	Brown	Poor	4.2	Positive	
7/27	698	Southwest corner	Steel structure	1	Metal	Yellow	Poor	>9.9	Positive	
7/27	699	Southwest corner	Steel structure	1	Metal	Brown	Poor	>9.9	Positive	
7/27	700	Southwest corner	Lower wall	1	Brick	Grey	Poor	>9.9	Positive	
7/27	701	Southwest corner	Pipe riser	1	Metal	Grey	Poor	>9.9	Positive	
7/27	702	Southwest corner	Steel structure	1	Metal	Grey	Poor	>9.9	Positive	
7/27	703	Drill floor	Radaitor	1	Metal	Grey	Poor	1.9	Positive	
7/27	704	Drill floor	Steel structure	1	Metal	White	Poor	5.8	Positive	
7/27	705	Drill floor	Upper wall	1	Concrete	White	Poor	-0.0		
7/27	706	Drill floor	Lower wall	1	Concrete	Brown	Poor	0.2		
7/27	707	Garage	Door case	2	Metal	Yellow	Fair	0.7		
7/27	708	Drill floor	Safety post	2	Metal	Yellow	Fair	5.3		
7/27	709	Drill floor	Door	3	Wood	Brown	Poor	3.5	Positive	
7/27	710	Drill floor	Door case	3	Wood	Brown	Poor	3.1	Positive	
7/27	711	Drill floor	Upper wall	3	Brick	Grey	Poor	5.7	Positive	
7/27	712	Drill floor	Lower wall	3	Brick	Brown	Poor	4.0	Positive	
7/27	713	Drill floor	Radiator cover	3	Metal	Brown	Poor	3.4	Positive	
7/27	714	Drill floor	Radiator	3	Metal	Brown	Poor	4.3	Positive	
7/27	715	Drill floor	Steel structure	3	Metal	Grey	Poor	>9.9	Positive	
7/27	716	Drill floor	Steel structure	3	Metal	Brown	Poor	>9.9	Positive	
7/27	717	Drill floor	Steel structure	3	Metal	Green	Poor	>9.9	Positive	

Table 1
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XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	718	Drill floor	Upper wall	3	Concrete	White	Poor	0.4		
7/27	719	Drill floor	Lower wall	3	Concrete	Brown	Poor	-0.0		
7/27	720	Drill floor	Door	3	Metal	Brown	Poor	0.2		
7/27	721	Drill floor	Door case	3	Metal	Brown	Poor	0.4		
7/27	722	Drill floor	Wall	3	Wood	Blue	Poor	3.6	Positive	
7/27	723	Drill floor	Wall	3	Wood	Red	Poor	0.1		
7/27	724	Drill floor	Upper wall	3	Wood	White	Poor	-0.1		
7/27	725	Drill floor	Lower wall	3	Wood	Brown	Poor	0.0		
7/27	726	Drill floor	Upper wall	3	Brick	Lt. Grey	Poor	3.6	Positive	
7/27	727	Drill floor	Lower wall	3	Brick	Grey	Poor	>9.9	Positive	
7/27	728	Drill floor	Floor	6	Concrete	Grey	Poor	1.0	Positive	
7/28	729	Calibrate						1.7		
7/28	730	Calibrate						1.9	Avg. 1.7	
7/28	731	Calibrate						1.8		
7/28	732	Calibrate						1.8		
7/28	733	Calibrate						1.9	Avg. 1.8	
7/28	734	Calibrate						1.8		
7/28	735	Drill floor	Gate	4	Metal	Green	Poor	0.0		
7/28	736	Drill floor	Gate case	4	Metal	Green	Poor	2.1	Positive	
7/28	737	Drill floor	Upper wall	4	Brick	White	Poor	0.0		
7/28	738	Drill floor	Lower	1	Brick	Brown	Poor	>9.9	Positive	
7/28	739	By office 1-W2	Hand rail	1	Metal	Grey	Poor	0.3		
7/28	740	By office 1-W2	Newel post	1	Metal	Grey	Poor	0.3		
7/28	741	Drill floor	Stringer	1	Metal	Grey	Poor	9.3	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	742	Drill floor	Side of mezz. deck	1	Metal	Green	Poor	8.4	Positive	
7/28	743	Drill floor	Side of mezz. deck	1	Metal	White	Poor	5.7	Positive	
7/28	744	Drill floor	Hand rail	1	Metal	Grey	Poor	3.0	Positive	
7/28	745	Drill floor	Newel post	1	Metal	Grey	Poor	>9.9	Positive	
7/28	746	Drill floor	Stringer	1	Metal	Grey	Poor	9.6	Positive	
7/28	747	Drill floor	Hand rail	3	Metal	Grey	Poor	2.1	Positive	
7/28	748	Drill floor	Newel post	3	Metal	Grey	Poor	>9.9	Positive	
7/28	749	Drill floor	Stringer	3	Metal	Grey	Poor	9.0	Positive	
7/28	750	Drill floor balcony	Window sill	3	Wood	White	Poor	2.7	Positive	
7/28	751	Drill floor balcony	Window apron	3	Wood	Grate	Poor	0.7		
7/28	752	Drill floor balcony	Metal structure	3	Metal	Green	Poor	>9.9	Positive	
7/28	753	Drill floor balcony	Radiator	3	Metal	Green	Poor	>9.9	Positive	
7/28	754	Drill floor balcony	Metal structure	3	Metal	Green	Poor	9.7	Positive	
7/28	755	Drill floor balcony	Fence	3	Metal	Green	Poor	1.7	Positive	
7/28	756	Drill floor balcony	Chair	3	Metal	Black	Poor	-0.1		
7/28	757	Drill floor balcony	Chair	1	Metal	Black	Poor	5.0	Positive	
7/28	758	Drill floor balcony	Metal structure	3	Metal	Green	Poor	5.4	Positive	
7/28	759	Drill floor balcony	Chair	1	Metal	Black	Poor	0.1		
7/28	760	Drill floor balcony	Fence	3	Metal	Green	Poor	3.8	Positive	
7/28	761	Drill floor balcony	Metal structure	1	Metal	Green	Poor	7.6	Positive	
7/28	762	Drill floor balcony	Fence	1	Metal	Green	Poor	2.0	Positive	
7/28	763	Drill floor balcony	Chair	1	Wood	Black	Poor	-0.0		
7/28	764	Drill floor balcony	Chair	1	Metal	Black	Poor	0.5		
7/28	765	Drill floor balcony	Wall	1	Brick	White	Poor	2.7	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	766	Drill floor balcony	Steel structure	1	Metal	Green	Poor	>9.9	Positive	
7/28	767	Drill floor balcony	Chair	1	Wood	Black	Poor	0.1		
7/28	768	Drill floor balcony	Chair	1	Metal	Black	Poor	0.5		
7/28	769	Drill floor balcony	Wall	1	Brick	White	Poor	0.0		
7/28	770	Drill floor balcony	Steel structure	1	Metal	Green	Poor	>9.9	Positive	
7/28	771	Drill floor balcony	Fence	1	Metal	Green	Poor	2.5	Positive	
7/28	772	Drill floor balcony	Wall	1	Brick	White	Poor	-0.1		
7/28	773	Homeless shelter corridor	Door	1	Metal	Purple	Fair	-0.0		
7/28	774	Homeless shelter corridor	Door case	1	Metal	Purple	Fair	0.1		
7/28	775	Homeless shelter corridor	Upper wall	1	Sheetrock	Pink	Fair	0.2		
7/28	776	Homeless shelter corridor	Upper wall	6	Sheetrock	Pink	Fair	0.1		
7/28	777	Homeless shelter corridor	Upper wall	3	Sheetrock	Pink	Fair	0.1		
7/28	778	Homeless shelter corridor	Upper wall	4	Sheetrock	Pink	Fair	-0.1		
7/28	779	Homeless shelter corridor	Lower wall	1	Sheetrock	Purple	Fair	-0.0		
7/28	780	Homeless shelter corridor	Lower wall	2	Sheetrock	Purple	Fair	-0.1		

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Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	781	Homeless shelter corridor	Lower wall	3	Sheetrock	Purple	Fair	-0.2		
7/28	782	Homeless shelter corridor	Lower wall	4	Sheetrock	Purple	Fair	-0.1		
7/28	783	Homeless shelter corridor	Door	4	Metal	Red	Fair	-0.1		
7/28	784	Homeless shelter corridor	Door case	4	Metal	Red	Fair	-0.0		
7/28	785	E dorm	Door	1	Metal	Blue	Fair	-0.0		
7/28	786	E dorm	Door case	1	Metal	Blue	Fair	-0.0		
7/28	787	E dorm	Upper wall	1	Sheetrock	Lt. Blue	Fair	-0.0		
7/28	788	E dorm	Upper wall	2	Sheetrock	Lt. Blue	Fair	-0.2		
7/28	788	E dorm	Upper wall	3	Plaster	Lt. Blue	Fair	-0.1		
7/28	789	E dorm	Upper wall	4	Plaster	Lt. Blue	Fair	>9.9	Positive	
7/28	790	E dorm	Lower wall	1	Sheetrock	Dark blue	Fair	-0.2		
7/28	791	E dorm	Lower wall	2	Sheetrock	Dark blue	Fair	-0.1		
7/28	792	E dorm	Lower wall	3	Plaster	Dark blue	Fair	>9.9	Positive	
7/28	793	E dorm	Lower wall	4	Plaster	Dark blue	Fair	>9.9	Positive	
7/28	794	E dorm	Window sill	3	Wood	Blue	Fair	>9.9	Positive	
7/28	795	E dorm	Window case	3	Wood	Blue	Fair	>9.9	Positive	
7/28	796	E dorm	Window sash	3	Wood	Blue	Fair	>9.9	Positive	
7/28	797	E dorm	Window apron	3	Wood	Blue	Fair	-0.1		
7/28	798	E dorm	Radiator	3	Metal	Blue	Fair	0.5		
7/28	799	E dorm	Hand rail	4	Metal	Black	Fair	0.5		

Table 1
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XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	800	E dorm	Stair tread	4	Concrete	Brown	Fair	0.0		
7/28	801	E dorm	Stair riser	4	Concrete	Brown	Fair	0.1		
7/28	802	E dorm	Pipe riser	3	Metal	Blue	Fair	>9.9	Positive	
7/28	803	E dorm	Partition	6	Wood	Blue	Fair	-0.0		
7/28	804	E dorm	Ceiling	5	Concrete	White	Fair	>9.9	Positive	
7/28	805	E dorm	Dujct	5	Metal	Beige	Fair	0.7		
7/28	806	D dorm	Door	1	Metal	Pink	Fair	-0.1		
7/28	807	D dorm	Door case	1	Metal	Pink	Fair	-0.0		
7/28	808	D dorm	Upper wall	1	Sheetrock	Beige	Fair	-0.1		
7/28	809	D dorm	Upper wall	2	Sheetrock	Beige	Fair	-0.1		
7/28	810	D dorm	Upper wall	3	Sheetrock	Beige	Fair	-0.3		
7/28	811	D dorm	Upper wall	4	Sheetrock	Beige	Fair	-0.0		
7/28	812	D dorm	Lower wall	1	Sheetrock	Pink	Fair	-0.1		
7/28	813	D dorm	Lower wall	2	Sheetrock	Pink	Fair	-0.1		
7/28	814	D dorm	Lower wall	3	Sheetrock	Pink	Fair	-0.0		
7/28	815	D dorm	Lower wall	4	Sheetrock	Pink	Fair	-0.1		
7/28	816	D dorm	Window sill	3	Wood	Pink	Fair	>9.9	Positive	
7/28	817	D dorm	Window case	3	Wood	Pink	Fair	>9.9	Positive	
7/28	818	D dorm	Window sash	3	Wood	Pink	Fair	>9.9	Positive	
7/28	819	D dorm	Window apron	3	Wood	Pink	Fair	-0.1		
7/28	820	D dorm	Radiator	3	Metal	Pink	Poor	3.2	Positive	
7/28	821	D dorm	Partition	3	Wood	Pink	Poor	-0.1		
7/28	822	D dorm	Duct	5	Metal	Beige	Fair	0.5		
7/28	823	D dorm	Ceiling	5	Concrete	Beige	Fair	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	824	B dorm	Door	1	Metal	Brown	Fair	-0.2		
7/28	825	B dorm	Door case	1	Metal	Purple	Fair	-0.1		
7/28	826	B dorm	Upper wall	1	Sheetrock	Beige	Fair	-0.2		
7/28	827	B dorm	Upper wall	2	Sheetrock	Beige	Fair	-0.1		
7/28	828	B dorm	Upper wall	3	Plaster	Beige	Fair	>9.9	Positive	
7/28	829	B dorm	Upper wall	4	Sheetrock	Beige	Fair	-0.2		
7/28	830	B dorm	Lower wall	1	Sheetrock	Yellow	Fair	0.0		
7/28	831	B dorm	Lower wall	2	Sheetrock	Yellow	Fair	-0.0		
7/28	832	B dorm	Lower wall	3	Plaster	Yellow	Fair	>9.9	Positive	
7/28	833	B dorm	Lower wall	4	Sheetrock	Yellow	Fair	-0.1		
7/28	834	B dorm	Window sill	3	Wood	Yellow	Fair	-0.1		
7/28	835	B dorm	Window case	3	Wood	Yellow	Fair	8.9	Positive	
7/28	836	B dorm	Window sash	3	Wood	Yellow	Fair	6.3	Positive	
7/28	837	B dorm	Window apron	3	Wood	Yellow	Fair	0.2		
7/28	838	B dorm	Radiator	3	Metal	Yellow	Fair	0.2		
7/28	839	B dorm	Duct	5	Metal	Beige	Fair	0.7		
7/28	840	B dorm	Ceiling	5	Concrete	Beige	Fair	9.7	Positive	
7/28	841	A dorm	Door	1	Metal	Peach	Fair	-0.1		
7/28	842	A dorm	Door case	1	Metal	Peach	Fair	-0.1		
7/28	843	A dorm	Upper wall	1	Sheetrock	Pink	Fair	-0.0		
7/28	844	A dorm	Upper wall	2	Plaster	Pink	Fair	>9.9	Positive	
7/28	845	A dorm	Upper wall	3	Plaster	Pink	Fair	>9.9	Positive	
7/28	846	A dorm	Upper wall	4	Sheetrock	Pink	Fair	0.0		
7/28	847	A dorm	Lower wall	1	Sheetrock	Peach	Fair	-0.3		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	848	A dorm	Lower wall	2	Plaster	Peach	Fair	0.0		
7/28	849	A dorm	Lower wall	3	Plaster	Peach	Fair	>9.9	Positive	
7/28	850	A dorm	Lower wall	4	Sheetrock	Peach	Fair	-0.0		
7/28	851	A dorm	Window sill	3	Wood	Peach	Fair	>9.9	Positive	
7/28	852	A dorm	Window case	3	Wood	Peach	Fair	>9.9	Positive	
7/28	853	A dorm	Window sash	3	Wood	Peach	Fair	5.9	Positive	
7/28	854	A dorm	Window apron	3	Wood	Peach	Fair	0.0		
7/28	855	A dorm	Radiator	3	Metal	Peach	Fair	-0.0		
7/28	856	A dorm	Pipe riser	3	Metal	Peach	Fair	0.4		
7/28	857	A dorm	Duct	3	Metal	Pink	Fair	>9.9	Positive	
7/28	858	A dorm	Ceiling	5	Concrete	Beige	Fair	>9.9	Positive	
7/28	859	A dorm	Duct	5	Metal	Beige	Fair	0.7		
7/28	860	A dorm	Partition	6	Wood	Pink	Fair	0.1		
7/28	861	Foyer, exit B	Door	1	Metal	Red	Fair	0.4		
7/28	862	Foyer, exit B	Door case	1	Metal	Red	Fair	1.6	Positive	
7/28	863	Foyer, exit B	Wall	1	Plaster	White	Fair	-0.1		
7/28	864	Foyer, exit B	Wall	2	Sheetrock	White	Fair	-0.1		
7/28	865	Foyer, exit B	Wall	3	Plaster	White	Fair	>9.9	Positive	
7/28	866	Foyer, exit B	Wall	4	Plaster	White	Fair	>9.9	Positive	
7/28	867	Foyer, exit B	Ceiling	5	Concrete	White	Fair	>9.9	Positive	
7/28	868	Foyer, exit B	Floor	6	Concrete	Grey	Poor	0.1		
7/28	869	Foyer, exit B	Hand rail	4	Metal	Black	Poor	0.4		
7/28	870	Foyer, exit B	Stair tread	4	Concrete	Black	Poor	0.4		
7/28	871	Foyer, exit B	Stair riser	4	Concrete	Black	Poor	0.4		

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Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	872	Foyer, exit B	Stringer	4	Concrete	Black	Fair	1.0	Positive	
7/28	873	National Guard area, entry foyer	Door	1	Metal	Grey	Fair	6.2	Positive	
7/28	874	National Guard area, entry foyer	Door case	1	Metal	Grey	Fair	5.2	Positive	
7/28	875	National Guard area, entry foyer	Door screen	1	Metal	Black	Fair	0.6		
7/28	876	National Guard area, entry foyer	Wndow case	4	Metal	Beige	Fair	2.7	Positive	
7/28	877	National Guard area, entry foyer	Window sash	4	Metal	Beige	Fair	3.7	Positive	
7/28	878	1st floor, corridor	Door case	1	Metal	Grey	Fair	0.1		
7/28	879	1st floor, corridor	Upper wall	1	Concrete	Ivory	Fair	1.3	Positive	
7/28	880	1st floor, corridor	Upper wall	2	Concrete	Ivory	Fair	1.0	Positive	
7/28	881	1st floor, corridor	Upper wall	3	Concrete	Ivory	Fair	1.3	Positive	
7/28	882	1st floor, corridor	Upper wall	4	Concrete	Ivory	Fair	-0.1		
7/28	883	1st floor, corridor	Lower wall	1	Concrete	Grey	Fair	0.4		
7/28	884	1st floor, corridor	Lower wall	2	Concrete	Grey	Fair	1.0	Positive	
7/28	885	1st floor, corridor	Lower wall	3	Concrete	Grey	Fair	1.4	Positive	
7/28	886	1st floor, corridor	Lower wall	4	Concrete	Grey	Fair	1.0	Positive	
7/28	887	1st floor, corridor	Radiator	3	Metal	Grey	Fair	0.6		
7/28	888	1st floor, corridor	Window sill	1	Concrete	Ivory	Fair	1.0	Positive	
7/28	889	1st floor, corridor	Window case	1	Metal	Black	Fair	1.6	Positive	
7/28	890	1st floor, corridor	Window sash	1	Metal	Black	Fair	2.5	Positive	

Table 7
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	891	1st floor, corridor	Ceiling	5	Sheetrock	Ivory	Fair	-0.0		
7/28	892	1st floor, corridor	Floor	6	Concrete	Grey	Fair	-0.2		
7/28	893	1st floor, corridor	Door	2	Metal	Red	Fair	-0.1		
7/28	894	1st floor, corridor	Door case	2	Metal	Red	Fair	-0.0		
7/28	895	2nd floor, corridor	Door	2	Wood	Stained	Fair	0.7		
7/28	896	2nd floor, corridor	Door case	2	Metal	Grey	Fair	1.4	Positive	
7/28	897	Office 2-14	Door	1	Wood	Grey	Fair	-0.3		
7/28	898	Office 2-14	Door case	1	Metal	Grey	Fair	1.6	Positive	
7/28	899	Office 2-14	Wall	1	Concrete	Ivory	Fair	1.4	Positive	
7/28	900	Office 2-14	Wall	2	Concrete	Ivory	Fair	1.7	Positive	
7/28	901	Office 2-14	Wall	3	Concrete	Ivory	Fair	1.3	Positive	
7/28	902	Office 2-14	Window sill	3	Concrete	Black	Fair	1.9	Positive	
7/28	903	Office 2-14	Window case	3	Metal	Black	Fair	4.0	Positive	
7/28	904	Office 2-14	Window sash	3	Metal	Black	Fair	2.8	Positive	
7/28	905	Office 2-14	Radiator	3	Metal	Black	Fair	0.6		
7/28	906	Office 24, staircase	Door	1	Metal	Brown	Fair	1.7	Positive	
7/28	907	Office 24, staircase	Upper wall	1	Concrete	Ivory	Fair	0.3		
7/28	908	Office 24, staircase	Upper wall	2	Concrete	Ivory	Fair	2.1	Positive	
7/28	909	Office 24, staircase	Upper wall	3	Concrete	Ivory	Fair	0.3		
7/28	910	Office 24, staircase	Upper wall	4	Concrete	Ivory	Fair	0.5		
7/28	911	Office 24, staircase	Lower wall	1	Metal	Grey	Fair	0.5		
7/28	912	Office 24, staircase	Lower wall	2	Metal	Grey	Fair	0.5		
7/28	913	Office 24, staircase	Lower wall	3	Metal	Grey	Fair	0.5		
7/28	914	Office 24, staircase	Lower wall	4	Metal	Grey	Fair	0.5		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	915	Office 24, staircase	Window case	3	Metal	Ivory	Fair	1.6	Positive	
7/28	916	Office 24, staircase	Window sash	3	Metal	Ivory	Fair	2.6	Positive	
7/28	917	Office 24, staircase	Hand rail	3	Metal	Black	Fair	5.2	Positive	
7/28	918	Office 24, staircase	Newel post	3	Metal	Black	Fair	1.9	Positive	
7/28	919	Office 24, staircase	Stair tread	3	Concrete	Grey	Fair	-0.1		
7/28	920	Office 24, staircase	Stair riser	3	Metal	Black	Fair	1.6	Positive	
7/28	921	Office 24, staircase	Stringer	3	Metal	Black	Fair	4.8	Positive	
7/28	922	Basement	Wall	1	Concrete	Blue	Fair	-0.1		
7/28	923	Basement	Wall	2	Concrete	Blue	Fair	-0.1		
7/28	924	Basement	Wall	3	Concrete	Blue	Fair	-0.1		
7/28	925	Basement	Wall	4	Concrete	Blue	Fair	-0.2		
7/28	926	Basement	Ceiling	5	Concrete	Blue	Fair	-0.0		
7/28	927	Basement	Door case	1	Metal	Red	Fair	0.3		
7/28	928	Basement	Duct	5	Metal	Blue	Fair	0.3		
7/28	929	Basement	Pipe riser	4	Metal	Blue	Fair	0.4		
7/28	930	Office 1-1	Door	1	Wood	Grey	Fair	-0.0		
7/28	931	Office 1-1	Door case	1	Metal	Grey	Fair	0.2		
7/28	932	Office 1-1	Wall	1	Concrete	Ivory	Fair	0.2		
7/28	933	Office 1-1	Wall	2	Concrete	Ivory	Fair	0.2		
7/28	934	Office 1-1	Wall	3	Concrete	Ivory	Fair	0.4		
7/28	935	Office 1-1	Wall	4	Concrete	Ivory	Fair	0.0		
7/28	936	Office 1-1	Baseboard	4	Concrete	Grey	Fair	0.4		
7/28	937	Office 1-1	Pipe riser	2	Metal	Ivory	Fair	0.5		
7/28	938	Office 1-1	Window case	2	Metal	Blue	Fair	3.3	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	939	Office 1-1	Window sash	2	Metal	Blue	Fair	4.6	Positive	
7/28	940	Office 1-1	Ceiling	5	Sheetrock	White	Fair	0.0		
7/28	941	Office 1-1	Floor	6	Concrete	Grey	Fair	0.3		
7/28	942	National Guard garage	Door	1	Metal	Grey	Fair	1.8	Positive	
7/28	943	National Guard garage	Door case	1	Metal	Grey	Fair	0.2		
7/28	944	National Guard garage	Upper wall	2	Concrete	Lt. grey	Fair	0.1		
7/28	945	National Guard garage	Lower wall	2	Concrete	Dark grey	Fair	0.2		
7/28	946	National Guard garage	Upper wall	3	Concrete	Lt. grey	Fair	2.0	Positive	
7/28	947	National Guard garage	Lower wall	3	Concrete	Dark grey	Fair	2.0	Positive	
7/28	948	National Guard garage	Upper wall	4	Concrete	Lt. grey	Fair	-0.1		
7/28	949	National Guard garage	Lower wall	4	Concrete	Dark grey	Fair	0.0		
7/28	950	National Guard garage	Partition wall	4	Wood	Pink	Fair	-0.1		
7/28	951	National Guard garage	Upper wall	1	Concrete	Lt. grey	Fair	0.1		
7/28	952	National Guard garage	Lower wall	1	Concrete	Dark grey	Fair	0.1		
7/28	953	National Guard garage	Lower wall	1	Concrete	Red	Fair	-0.1		
7/28	954	National Guard garage	Window case	2	Metal	Grey	Poor	1.9	Positive	
7/28	955	National Guard garage	Floor	6	Concrete	Grey	Fair	-0.2		
7/28	956	National Guard garage	Ceiling	5	Concrete	Grey	Fair	-0.1		
7/28	957	National Guard garage	Beam	5	Metal	Grey	Fair	3.5	Positive	
7/28	958	National Guard garage	Floor	6	Concrete	Yellow	Fair	>9.9	Positive	
7/28	959	National Guard garage	Safety cover	2	Metal	Green	Fair	3.5	Positive	
7/28	960	National Guard garage	Control panel	4	Metal	Blue	Fair	0.0		
7/28	961	Calibrate						1.7		
7/28	962	Calibrate						1.9	Avg. 1.8	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	963	Calibrate						1.8		
7/28	964	Basement, auditorium	Door	1	Wood	Green	Poor	0.4		
7/28	965	Basement, auditorium	Door case	1	Wood	Green	Poor	0.5		
7/28	966	Basement, auditorium	Upper wall	1	Plaster	Grey	Poor	-0.1		
7/28	967	Basement, auditorium	Upper wall	2	Plaster	Grey	Poor	-0.0		
7/28	968	Basement, auditorium	Upper wall	4	Plaster	Grey	Poor	-0.1		
7/28	969	Basement, auditorium	Lower wall	1	Plaster	Beige	Poor	-0.0		
7/28	970	Basement, auditorium	Lower wall	2	Plaster	Beige	Poor	0.2		
7/28	971	Basement, auditorium	Lower wall	4	Plaster	Beige	Poor	-0.1		
7/28	972	Basement, auditorium	Baseboard	1	Concrete	Grey	Poor	0.5		
7/28	973	Basement, auditorium	Column upper	6	Concrete	Grey	Poor	0.1		
7/28	974	Basement, auditorium	Column lower	6	Concrete	Beige	Poor	-0.0		
7/28	975	Basement, auditorium	Floor	6	Concrete	Grey	Poor	0.3		
7/28	976	Basement, auditorium	Ceiling	5	Concrete	Grey	Poor	-0.0		
7/28	977	Basement, auditorium	Stringer	1	Metal	Beige	Poor	>9.9	Positive	
7/28	978	Bsmnt, corridor stairs	Hand rail	6	Metal	Grey	Poor	7.9	Positive	
7/28	979	Bsmnt, corridor stairs	Newel post	6	Metal	Grey	Poor	4.9	Positive	
7/28	980	Bsmnt, corridor stairs	Stringer	6	Metal	Grey	Poor	>9.9	Positive	
7/28	981	Bsmnt, corridor stairs	Hand rail	6	Metal	Grey	Poor	5.8	Positive	
7/28	982	Bsmnt, corridor stairs	Newel post	6	Concrete	Grey	Poor	6.4	Positive	
7/28	983	Bsmnt, corridor stairs	Stringer	6	Concrete	Grey	Poor	4.5	Positive	
7/28	984	Bsmnt, corridor stairs	Ceiling	5	Concrete	White	Poor	0.3		
7/28	985	Lock RC3	Ceiling	5	Concrete	White	Poor	7.2	Positive	
7/28	986	Lock RC17	Ceiling	5	Concrete	White	Poor	0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	987	Gym	Ceiling	5	Concrete	Grey	Poor	-0.1		
7/28	988	Boiler R	Ceiling	5	Concrete	Grey	Poor	7.3	Positive	
7/28	989	Boiler R#1	Ceiling	5	Concrete	Grey	Poor	>9.9	Positive	
7/28	990	Boiler R#2	Ceiling	1	Concrete	Grey	Poor	0.3		
7/28	991	B40	Door case	1	Metal	Blue	Poor	1.7	Positive	
7/28	992	B40	Wall	1	Plaster	Yellow	Poor	-0.1		
7/28	993	B40	Wall	2	Plaster	Yellow	Poor	>9.9	Positive	
7/28	994	B40	Wall	3	Plaster	Yellow	Poor	>9.9	Positive	
7/28	995	B40	Wall	4	Plaster	Yellow	Poor	>9.9	Positive	
7/28	996	B40	Radiator	1	Metal	Silver	Poor	0.3		
7/28	997	B40	Window sill	3	Wood	Blue	Poor	0.2		
7/28	998	B40	Window case	3	Wood	Blue	Poor	0.3		
7/28	999	B40	Window sash	3	Wood	Blue	Poor	0.2		
7/28	1	B40	Window apron	3	Wood	Blue	Poor	0.2		
7/28	2	B40	Ceiling	5	Concrete	White	Poor	>9.9	Positive	
7/28	3	B40	Pipe riser	3	Metal	Blue	Poor	1.5	Positive	
7/28	4	B48	Door	1	Metal	Grey	Poor	4.5	Positive	
7/28	5	B48	Door case	1	Metal	Grey	Poor	7.8	Positive	
7/28	6	B48	Wall	1	Concrete	Yellow	Poor	-0.1		
7/28	7	B48	Wall	2	Concrete	Yellow	Poor	0.1		
7/28	8	B48	Wall	3	Brick	Yellow	Poor	0.1		
7/28	9	B48	Wall	4	Concrete	Green	Poor	0.0		
7/28	10	B48	Ceiling	5	Concrete	Green	Poor	0.0		
7/28	11	B48	Shelf	4	Wood	Grey	Poor	0.6		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	12	B48	Shelf support	4	Wood	Grey	Poor	0.7		
7/28	13	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Hand rail	1	Metal	Grey	Poor	>9.9	Positive	
7/28	14	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Newel post	1	Metal	Grey	Poor	7.0	Positive	
7/28	15	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Stringer	1	Metal	Grey	Poor	8.8	Positive	
7/28	16	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Flag pole	1	Metal	Ivory	Poor	1.7	Positive	
7/28	17	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Flag pole base	1	Metal	Ivory	Poor	0.4		
7/28	18	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Artelery deco.	1	Metal	Ivory	Poor	1.5	Positive	
7/28	19	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Hand rail	1	Metal	Black	Poor	4.2	Positive	

Tab
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	20	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Door	1	Metal	Black	Poor	1.6	Positive	
7/28	21	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Guard railing	1	Metal	Black	Poor	1.5	Positive	
7/28	22	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Fence	1	Metal	Black	Poor	2.8	Positive	
7/28	23	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Gate	1	Metal	Black	Poor	0.2		
7/28	24	Ext. Jerome Avenue.	Door	4	Metal	Black	Poor	-0.0		
7/28	25	Ext. Jerome Avenue.	Door case	4	Metal	Black	Poor	1.5	Positive	
7/28	26	Ext. Jerome Avenue.	Door guard	4	Metal	Black	Poor	0.2		
7/28	27	Ext. Jerome Avenue.	Window apron	4	Concrete	Black	Poor	0.1		
7/28	28	Ext. Jerome Avenue.	Vent	4	Metal	Black	Poor	5.7	Positive	
7/28	29	Ext. Jerome Avenue.	Window guard	4	Metal	Black	Poor	1.4	Positive	
7/28	30	National Guard office building	Wall	1	Brick	Green	Poor	-0.0		
7/28	30	National Guard office building	Gate	1	Metal	Black	Poor	4.1	Positive	
7/28	31	National Guard office building	Fence	1	Metal	Black	Poor	5.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	32	National Guard office building	Hand rail	1	Metal	Grey	Poor	2.7	Positive	
7/28	33	National Guard office building	Door	1	Metal	Grey	Poor	5.4	Positive	
7/28	34	National Guard office building	Door case	1	Metal	Grey	Poor	3.9	Positive	
7/28	35	Exit	Gas guage	4	Metal	Yellow	Fair	1.8	Positive	
7/28	36	Exit	Gas guage	4	Metal	Grey	Fair	0.5		
7/28	37	Exit	Door	4	Metal	Grey	Fair	1.9	Positive	
7/28	38	Exit	Door case	4	Metal	Grey	Fair	5.3	Positive	
7/28	39	Exit	Hand rail	4	Metal	Grey	Fair	0.7		
7/28	40	Garage exit	Door case	1	Metal	Green	Fair	4.1	Positive	
7/28	41	Garage exit	Gate	1	Metal	Green	Fair	0.3		
7/28	42	Garage exit	Fence	1	Metal	Blak	Fair	3.1	Positive	
7/28	43	Garage exit	Door	2	Metal	Green	Fair	0.1		
7/28	44	Garage exit	Door case	2	Metal	Green	Fair	1.4	Positive	
7/28	45	Garage exit	Pipe riser	2	Metal	Green	Fair	1.7	Positive	
7/28	46	Garage exit	Window gate	1	Metal	Green	Fair	3.1	Positive	
7/28	47	Garage exit	Smoke stack door	2	Metal	Green	Fair	-0.0		
7/28	48	Garage exit	Storage cont. wall	1	Metal	Green	Fair	-0.0		
7/28	49	Garage exit	Storage cont. wall	2	Metal	Green	Fair	0.4		
7/28	50	Garage exit	Storage cont. wall	4	Metal	Green	Fair	0.4		
7/28	51	Garage exit	Fence	4	Metal	Black	Fair	>9.9	Positive	
7/28	52	Garage exit	Door	4	Metal	Green	Fair	3.5	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	53	Garage exit	Door	4	Metal	Yellow	Fair	1.7	Positive	
7/28	54	Garage exit	Safety corner	4	Metal	Yellow	Fair	7.0	Positive	
7/28	55	Garage exit	Safety corner	4	Metal	Green	Fair	5.7	Positive	
7/28	56	Garage exit	Door	4	Metal	Green	Fair	1.7	Positive	
7/28	57	Garage exit	Door case	4	Metal	Green	Fair	>9.9	Positive	
7/28	58	Garage exit	Window guard	4	Metal	Green	Fair	2.4	Positive	
7/28	59	Garage exit	Drain pipe	4	Metal	Green	Fair	0.1		
7/28	60	Garage exit	Pipe riser	4	Metal	Green	Fair	0.6		
7/28	61	Calibrate						1.8		
7/28	62	Calibrate						1.7	Avg. 1.8	
7/28	63	Calibrate						1.9		

ATC ASSOCIATES, INC
104 E 25th Street, 10th Floor
New York, NY 10010
Tel. 212-353-8280
Fax 212-353-8306

REPORT DATE: 08-14-00

CLIENT: ET Environmetal

PROJECT No: 75018.0001

SAMPLED BY: F. Burkhardt

SAMPLE DATE: 08-11-00
DATE RECEIVED: 08-13-00
DATE ANALYZED: 08-13-00

SAMPLE MEDIA: Paint Chips
ANALYSIS REQUIRED: Method EPA 3050/7420

ANALYSIS RESULTS

SAMPLE ID	BATCH NO.	SAMPLE DESCRIPTION	LEAD CONCENTRATION (% by weight)	DETECTION LIMIT
1	8583	Rifle. R. - Aband.	0.07	0.01
2	8583	Rifle R. - Active	0.04	0.01
3	8583	Pistol 1-4	1.17	0.01
4	8583	Pistol 9-12	56.67	0.01
C-1	8583	Steel Truss	32.21	0.01
C-2	8583	Steel Truss	39.68	0.01
C-3	8583	Steel Truss	16.56	0.01
C-4	8583	Steel Truss	21.66	0.01
C-5	8583	Steel Truss	8.92	0.01
C-6	8583	Steel Truss	0.46	0.01

NOTE 1:
THE REPORTING LIMIT (RL) IS 0.01%

NOTE 2:
HUD defines lead-based paint as paint having a lead concentration equal to or above 0.5% by weight.
Results preceded by "<" are below the detectable levels by this analysis method.

ATC ASSOCIATES, INC
104 E 25th Street, 10th Floor
New York, NY 10010
Tel. 212-353-8280
Fax 212-353-8306

CERTIFICATION AND SIGNATURES

ANALYSIS PERFORMED BY: TC

REPORT PREPARED BY: [signature]

ATC certifies that this report is an accurate and authentic report of results obtained from the laboratory analysis.

QUALITY ASSURANCE COORDINATOR: [signature]

LABORATORY DIRECTOR: [signature]

ATC is accredited by the New York State Department of Health Environmental Laboratory Approval Program (NYS DOH ELAP) to perform analysis of lead in paint and dust wipes (ELAP #10879).

AIC ASSOCIATES INC.

104 EAST 25TH STREET
NEW YORK, NY 10010
PHONE: 212-353-8280 FAX: 212-979-8447

8582

CHAIN OF CUSTODY

CLIENT NAME: ET ENVIRONMENTAL

SITE ADDRESS: KINGSBRIDGE ARMORY

JOB #: 75018.0001

SAMPLE TYPE (Paint Chip, Dust Wipe, etc...): CHIP / GRAB

OF SAMPLES: 10

SAMPLED BY: F. BURICHARDT

ANALYSIS REQUIRED (AAS-mg/sq.cm, etc...): PB-AAS 0/0 WT

TURN AROUND TI: SAME DAY

	SAMPLE I.D.	DATE	SAMPLE DESCRIPTION/LOCATION	AREA (in x in)	D.L.	RESULT OF ANAL
1	1	8/11	RIFLE RANGE - ABANDONED	N/A		
2	2	"	" - ACTIVE	"		
3	3	"	PISTOL 1-4	"		
4	4	"	PISTOL 9-12	"		
5	C-1	"	STEEL TRUSS	"		
6	C-2	"	"	"		
7	C-3	"	"	"		
8	C-4	"	"	"		
9	C-5	"	"	"		
10	C-6	8/11	"	"		
	--			N/A		

RELINQUISHED BY (SIGNATURE BELOW) | DATE/TIME 8/14 | RECEIVED BY: (SIGNATURE BELOW)

PRINT NAME: (BELOW) BURICHARDT | PRINT NAME: (BELOW) | DATE/TIME

RELINQUISHED BY (SIGNATURE BELOW) | DATE/TIME | RECEIVED BY: (SIGNATURE BELOW) 8/15/00 10am

PRINT NAME: (BELOW) | PRINT NAME: (BELOW) | DATE/TIME

SAMPLING PROVIDED BY:

AIHA NLLAP # | LABORATORY DIRECTOR (SIGNATURE) | PRINT NAME: (BELOW) | DATE/TIME

ATC ASSOCIATES, INC
104 E 25th Street, 10th Floor
New York, NY 10010
Tel. 212-353-8280
Fax 212-353-8306

REPORT DATE: 07-31-00

CLIENT: ET

PROJECT ADDRESS: Kingsbridge Armory

SAMPLE BY: M. Medinets

SAMPLE DATE: 07-24-00
DATE RECEIVED: 07-28-00
DATE ANALYZED: 07-28-00

SAMPLE MEDIA: Paint Chips
ANALYSIS REQUIRED: Method EPA 3050/7420

ANALYSIS RESULTS

SAMPLE ID	BATCH NO.	SAMPLE DESCRIPTION	LEAD CONCENTRATION (% by weight)	DETECTION LIMIT
01	8553	Stair Tread Sub. Bsmt. (Boiler Room)	0.13	0.01
02	8553	Control Panel Rm #3 Boiler Room	0.01	0.01
03	8553	Rm 4 Basment C16 Mez. Door	1.38	0.01

NOTE 1:
THE REPORTING LIMIT (RL) IS 0.01%

NOTE 2:
HUD defines lead-based paint as paint having a lead concentration equal to or above 0.5% by weight.
Results preceded by "<" are below the detectable levels by this analysis method.

CERTIFICATION AND SIGNATURES

ANALYSIS PERFORMED BY: _____

REPORT PREPARED BY: _____

ATC certifies that this report is an accurate and authentic report of results obtained from the laboratory analysis.

QUALITY ASSURANCE COORDINATOR: _____

LABORATORY DIRECTOR: _____

ATC is accredited by the New York State Department of Health Environmental Laboratory Approval Program (NYS DOH ELAP) to perform analysis of lead in paint and dust wipes (ELAP #10879).

ATC ASSOCIATES INC.
PAINT CHIP SAMPLING - CHAIN OF CUSTODY
104 EAST 25TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10010
PHONE: 212-353-8280 FAX: 212-979-8447

5553

PAGE___OF___
TOTAL # OF SAMPLES:___

ient Name: ET
oject Address: Kingsbridge Armory
vestigator:
Client Number:
Project Manager: F. Burkhardt
Room Number:
Date: 7.24.00
Turnaround Time: 24h
Required: % by weight

Sample Number	Component & Location	Condition of Paint Surface	Substrate	Surface Paint Color	Type of Structure	Detection Limit	Pb % by Weight
01	Stair tread Sub BSM (Boiler Room)	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster___Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential	0.01	0.13
02	control panel R#3 boiler room	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster___Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential	0.01	0.01
03	R#4 BSM C 16 Mez Door	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster___Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential	0.01	1.38
		Intact / Fair / Poor	Sheetrock / Wood / Metal / Masonry / Plaster___Other		Steel Structure / Commercial / Industrial / Residential		
		Intact / Fair / Poor	Sheetrock / Wood / Metal / Masonry / Plaster___Other		Steel Structure / Commercial / Industrial / Residential		

OMMENTS:

LINQUISHED BY (SIGNATURE BELOW):	DATE/TIME	RECIEVED BY (SIGNATURE BELOW):	DATE/TIME:	LABORATORY:	
M. Medinets	7.28.00	AM 07/28 9pm			
INT NAME:	DATE/TIME	PRINT NAME:	DATE/TIME:	NLLAP#	ELAP#

CHAIN OF CUSTODY RECORD

WORK ORDER NO. _____

SCILAB

SCILAB BOSTON, INC.

8 School Street Weymouth, MA 02189-8951
781 337-9334 / FAX 781 337-7642

DUE DATE _____

COMPANY: ATC ASSOCIATES
104 EAST 25TH ST - 10TH FL
NY, NY 10010

PHONE: 212-353-8780 FAX #: 212-353-8306

P.O.#: 75010-1

CLIENT CONTACT: _____

PROJECT #: KINGSBRIDGE ARMORY

SAMPLE TYPE
1. WATER 6. WIPES
2. SOIL 7. AIR CASSETTE
3. SLUDGE 8. OTHER
4. OIL
5. CHIPS

CONTAINER TYPE
P - PLASTIC
G - GLASS
V - VOA

SCILAB SAMPLE #	CLIENT SAMPLE IDENTIFICATION	SAMPLE TYPE	CONTAINER SIZE	CONTAINER TYPE	CONTAINER #	SAMPLING INFORMATION DATE	TIME	TECH	PRESERVATIVES	TCLP LEAD	SAMPLE pH at Login
	1	2		P						X	
	2	2		P						X	
	3	2		P						X	
	4	2		P						X	

REPORT PACKAGES
- MWRA ☐
- MA DEP ☐
- RDR ☐
- ASP A ☐
- ASP B ☐
- QC LEVEL 1 ☐
- QC LEVEL 2 ☐

SAMPLED BY: J. Burns

RELINQUISHED BY: FEDEX 8198 2057 4640 — J. Burns

RELINQUISHED BY: _____

	DATE	TIME	RECEIVED BY	DATE	TIME
	8/11/00	1100			
	8/11/00	1700			

Temperature upon receipt _____

SPECIAL INSTRUCTIONS

☐ 24 HOUR TAT ☐ 72 HOUR TAT

☒ 48 HOUR TAT ☐ 5 DAY TAT

Shade circle for ... ory use only.
Gold copy - Or ... Retains
Pink copy - Ship ...
... White and Yellow copies to the laboratory

TOTAL P.02

ATC ASSOCIAT[illegible] INC.

PAINT CHIP SAMPLING - C[illegible]OF CUSTODY

104 EAST 25TH STREET, [illegible]FLOOR
NEW YORK, NEW YORK 10010
PHONE: 212-353-8280 FAX: 212-979-8447

PAGE 1 O

TOTAL # OF SAMPLES: 3

Name: ET

Client Number:

Date: 7.24.00

: Address: Kingsbridge Armory

Project Manager: F. Burkhardt

Turnaround Time: 24h

gator:

Room Number:

Required: % by weight

ıple ıber	Component & Location	Condition of Paint Surface	Substrate	Surface Paint Color	Type of Structure	Detection Limit	Pb % by Weight
1	Stair tread Sub BSM (Boiler Room)	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential		
2	control panel R#3 boiler room	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential		
3	R#4 BSM C 16 Mez Door	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential		
		Intact / Fair / Poor	Sheetrock / Wood / Metal / Masonry / Plaster Other		Steel Structure / Commercial / Industrial / Residential		
		Intact / Fair / Poor	Sheetrock / Wood / Metal / Masonry / Plaster Other		Steel Structure / Commercial / Industrial / Residential		

ITS:

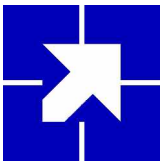
HED BY (SIGNATURE BELOW): DATE/TIME	RECIEVED BY (SIGNATURE BELOW):	DATE/TIME:	LABORATORY:	
Medicus 7.28.00				
E: DATE/TIME	PRINT NAME:	DATE/TIME:	NLLAP#	ELAP#

wpchip.xls

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD
BOROUGH OF THE BRONX – CITY OF NEW YORK

Prepared for



NEW YORK CITY
ECONOMIC DEVELOPMENT CORPORATION
110 WILLIAM STREET
NEW YORK, NEW YORK 10038

Prepared by

METCALF & EDDY | AECOM

METCALF & EDDY, INC.
1140 ROUTE 22 EAST, SUITE 101
BRIDGEWATER, NEW JERSEY 08807

PROJECT NO. 60013075.01

SEPTEMBER 2006

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EXECUTIVE SUMMARY

Metcalf & Eddy of New York, Inc. ("M&E") was retained by the New York City Economic Development Corporation ("EDC") to conduct a Phase I Environmental Site Assessment ("ESA") of a property identified as the Kingsbridge Armory (the "Armory") and located at 29 West Kingsbridge Road (the "Site") in the Borough of the Bronx, New York. The Site is identified by the New York City Department of Finance as Block 3247, Lot 2 and is located on five (5) acres and encompasses four (4) city blocks. The Armory is situated north of West Kingsbridge Road, south of West 195th Street, east of Reservoir Avenue and west of Jerome Avenue in the Kingsbridge Heights section of the Borough of the Bronx in the City of New York (the "City"). The Armory was designed by architects Pilcher and Tachau as a medieval, Romanesque-style fortress with towers and parapets and built between 1913 and 1917. The Armory is comprised of over 475,000 square feet of space and was formerly used as a staging area for military operations and training in the Bronx. Two (2) annex buildings are located north of the Armory along West 195th Street. The building located at 10 West 195th Street is a two (2) story concrete and brick structure and currently houses the State Armory National Guard Recruiting office and the 258th Field Artillery Unit. A one (1) story building located near the intersection of Reservoir Avenue and West 195th Street is used for vehicle storage by the National Guard. Major renovations to the Armory were conducted by Turner Construction between 2000 and 2005. The renovations included the roof above the drill floor, the company rooms and towers south of the drill floor, and asbestos abatement of the roofing material and piping insulation on the mezzanine level of the drill floor. The Site which is owned by the City, was designated a New York City landmark in September 1974 and was placed on the National Register of Historic Places in 1982.

An environmental database provided by Environmental Data Resources ("EDR") identified sites within the search radii where documented environmental impacts have occurred. Although the EDR database information did not include any documentation from which it could be concluded that the sites identified within the search radii have impacted the Site, it is possible that groundwater under the site has been impacted due to the industrial/commercial use of the surrounding area, and by potential contamination in on-site fill materials. However, it should be noted that the groundwater in this area is not used as a potable source.

During the Phase I ESA, a visual inspection of the Site was performed. The visual inspection identified three (3) 275 gallon above ground fuel oil tanks ("ASTs"). One (1) tank is located in the northeast corner of the building on the drill hall floor; the two (2) remaining tanks are located two (2) levels below the drill hall in the southwestern portion of the building, east of the former

bowling alley. None of the tanks appeared to contain significant amounts of product. A petroleum odor was detected in room B-20 located on the first level below the drill floor in the western portion of the building; however, no source for the odor could be located. Several 5-gallon pails of Esguard LubraKote Black, a flashing cement, were observed in several of the rooms on the second level below the drill hall in the western portion of the building. Cans of motor oil, brake fluid and other petroleum-based lubricants as well as empty gasoline cans were observed in the motor pool workshops located along the northern portion of the company rooms on the mezzanine of the second level below the drill floor. Ten (10) 55-gallon steel drums were observed in the parking/vehicle storage area located three (3) levels below the drill hall floor. The drums are beginning to show signs of deterioration with rust and holes present in several of the drums. The content of the drums is unknown, although most appear to be free of liquids. In addition, possible oil staining of the concrete near the center of the parking/vehicle storage area was observed as well as an area where the concrete floor was saw cut and backfilled with sand. This area may have once contained a UST.

Three (3) earthen floored rifle and pistol ranges were observed on the Site and are suspected to contain elevated concentrations of lead from spent munitions. The first pistol range is located on the second level below the motor pool workshops. Spent munitions were observed embedded in the wooden walls of pistol range. The other pistol/rifle ranges are located on the third level below the drill floor in the eastern portion of the building near Jerome Avenue. No spent munitions were observed at these ranges.

Deteriorating equipment such as the boiler located in the southwestern portion of the basement of the company rooms and air conditioning units located in the northeastern portion of the Armory, one (1) level beneath the drill hall may contain asbestos, lubricating oils and refrigerants. Peeling paint that may contain lead, light ballasts possibly containing polychlorinated biphenyls ("PCBs"), potential asbestos containing materials ("ACM") including pipe wrap and floor tiles and extensive mold growth was present in the majority of the company rooms located along the southern portion of the Armory and the company rooms beneath the drill hall. In addition, water damage to the walls, ceilings and floors of the upper level company rooms and turret rooms is prevalent.

In September 2000, ET Environmental submitted an Environmental Survey Report to the EDC prior to the roofing renovations to determine the presence of asbestos, lead-based paint ("LBP") and bird droppings. Samples collected in the vicinity of the work areas indicated non-friable asbestos and LBP were present on the Site. Additional sampling for PACM, LBP and a light ballast survey are recommended for the company rooms and the levels beneath the drill hall. A

survey of the 55 gallon drums should be conducted to include an inventory of the drums and a determination of the contents of the drums. Once completed, the drums and their contents should be properly disposed. It is also recommended that the three (3) ASTs be removed as well as the petroleum products in the motor pool workshops and the lower levels beneath the drill hall. Deteriorating equipment should also be properly removed from the site. In addition, the earthen floors of the pistol and rifle ranges and the spent rounds from the walls of the second level pistol range should be removed due to the potential presence of lead.

Additional recommendations could be warranted should potential environmental issues be identified by outstanding FOIL/Information requests submitted to the New York City Department of Environmental Protection, the New York City Department of Health, and the New York State Department of Health.

1.0 INTRODUCTION

Metcalf & Eddy of New York, Inc. ("M&E") was retained by the New York City Economic Development Corporation ("EDC") to conduct a Phase I Environmental Site Assessment ("ESA") of a property identified as the Kingsbridge Armory (the "Armory") and located at 29 West Kingsbridge Road (the "Site")in the Borough of the Bronx, New York. The Site is identified by the New York City Department of Finance as Block 3247, Lot 2 and is located on five (5) acres and encompasses four (4) city blocks. The Armory is situated north of West Kingsbridge Road, south of West 195th Street, east of Reservoir Avenue and west of Jerome Avenue in the Kingsbridge Heights section of the Borough of the Bronx in the City of New York (the "City"). The Armory was designed by architects Pilcher and Tachau as a medieval, Romanesque-style fortress with towers and parapets and built between 1913 and 1917. The Armory is comprised of over 475,000 square feet of space and was formerly used as a staging area for military operations and training in the Bronx. Two (2) annex buildings are located north of the Armory along West 195th Street. The building located at 10 West 195th Street is a two (2) story concrete and brick structure and currently houses the State Armory National Guard Recruiting office and the 258th Field Artillery Unit. A one (1) story building located near the intersection of Reservoir Avenue and West 195th Street is used for vehicle storage by the National Guard. Major renovations to the Armory were conducted by Turner Construction between 2000 and 2005. The renovations included the roof above the drill floor, the company rooms and towers south of the drill floor, and asbestos abatement of the roofing material and piping insulation on the mezzanine level of the drill floor. The Site which is owned by the City, was designated a New York City landmark in September 1974 and was placed on the National Register of Historical Places in 1982.

1.1 Purpose

The ESA was performed to determine if any potential environmental impacts occurred at or in the vicinity of the Site.

1.2 Report Outline

The report is divided into twelve (12) sections:

- Section 1 presents the introduction to the report;
- Section 2 details M&E's scope of work for this project;
- Section 3 provides information on the site background, setting, and operations;
- Section 4 provides details on the historical use and development of the site;

- Section 5 presents the results of the regulatory agency review;
- Section 6 presents the results of contacts with local agencies;
- Section 7 presents information provided by the client;
- Section 8 provides observations made during the site reconnaissance;
- Section 9 identifies facility personnel who were interviewed;
- Section 10 presents M&E's findings and conclusions;
- Section 11 presents a statement of limitations; and,
- Section 12 contains a list of references.

2.0 SCOPE OF WORK

2.1 Scope of Assessment

The purpose of the ESA was to evaluate the Site conditions with respect to potential impacts to soil or groundwater from petroleum products or hazardous substances. The scope of the ESA consisted of the performance of a site walk-through and visual site inspection with respect to environmental issues, interviews with key personnel, and requesting/reviewing local governmental files relating to environmental issues at the Site. An environmental database search (Appendix B), historical aerial photographs (Appendix C), Sanborn Fire Insurance Maps (Appendix D), historical topographic maps (Appendix E), a city directory search (Appendix F), and an Environmental Lien search (Appendix G) were obtained from Environmental Data Resources, Inc. ("EDR") in Southport, Connecticut.

2.2 Significant Assumptions

This Phase I ESA was prepared using information obtained from/provided by the following sources:

- Information provided by the client;
- Visual inspection of the subject site;
- Available published information;
- EDR database searches;
- Local/State government officials; and,
- Site/Owner representatives.

It is assumed that the information obtained through the above methods is valid and accurate as provided. The passage of time, manifestation of latent conditions, and occurrence of future events or changes to existing codes/regulations may alter the conclusions and recommendations of this report.

2.3 Limitations and Exceptions

Performance of the Phase I ESA was limited to a visual assessment of the Site.

2.4 Reliance

This report has been prepared on behalf of and for the exclusive use of the EDC and is subject to

and issued in connection with the Agreement and provisions thereof.

3.0 SITE BACKGROUND

3.1 Location

The Site is located at 29 West Kingsbridge Road on five (5) acres and encompassing four (4) city blocks in the Kingsbridge Heights section of the Borough of the Bronx (Figure 1). The geographic coordinates for the Site are 40° 52' 3.0" N, 73° 53' 51.0" W. The Site is identified by the City of New York Department of Finance as Block 3247, Lot 2.

The Site is comprised of an approximate 900,000 square foot building formerly used as a staging area for military operations and training in the Bronx. Two (2) annex buildings are located north of the Armory along West 195th Street. The building located at 10 West 195th Street is a two (2) story concrete and brick structure and currently houses the State Armory National Guard Recruiting office and the 258th Field Artillery Unit. A one (1) story building located near the intersection of Reservoir Avenue and West 195th Street is used for vehicle storage by the National Guard. The Site is approximately 130-140 feet above mean sea level ("msl"), based upon United States Geological Survey ("USGS") Central Park NY-NJ 7.5 Minute Quadrangle and EDR mapping obtained for the Site. A Site Plan is provided as Figure 2.

3.2 Geology/Hydrogeology

The area containing the Site lies within the glaciated Highlands physiographic province of New York. The bedrock geology in the area, described in a report titled Geology and Engineering Geology of the New York Metropolitan Area, Field Trip Guidebook T361 (Baskerville 1989) prepared for the 28th International Geological Congress, consists of the Fordham Gneiss of Proterozoic age. Surficial deposits in the region are mapped as glacial till (Cadwell et al 1986). Depending upon the specific location in the region the overburden material could also include fluvial, marine-tidal marsh, and recent fill deposits. Many low-lying areas have been historically filled to accommodate development. The bedrock surface is reportedly greater than 20 feet below grade near the Site, but large outcrops are visible east of Third Avenue. The outcrop appears to be associated with the Fordham Gneiss, member C, which consists of a fine-grained schist with biotite-muscovite-quartz interlayers.

Soils in New York City are typically classified as "Urban Land", a generic description of soils that have been buried, re-worked, or otherwise altered as a result of human activities. The buried, native soils in the general area of the Site are believed to be composed of loamy sand, silt loam, sandy loam and fine sandy loam. The deeper soil types are believed to consist of very gravelly-loamy sand, and stratified sandy loam. It is likely that the original soils at the Site developed on

glacial material.

3.3 Description of Facilities

The Armory was designed by architects Pilcher and Tachau as a medieval, Romanesque-style fortress with towers and parapets and built between 1913 and 1917. The Armory is located on five (5) acres encompassing four (4) city blocks and was formerly used as a staging area for military operations and training in the Bronx. Two (2) annex buildings are located north of the Armory along West 195th Street. The building located at 10 West 195th Street is a two (2) story concrete and brick structure and currently houses the State Armory National Guard Recruiting office and the 258th Field Artillery Unit. A one (1) story building located near the intersection of Reservoir Avenue and West 195th Street is used for vehicle storage by the National Guard. Major roof renovations to the metal and glass roof spanning the drill hall and to the flat roof behind the parapets above the company rooms located south of the drill hall were conducted between 2000 and 2005.

Three (3) levels exist beneath the drill hall floor. These levels include additional company rooms and work shops, a theater and lecture hall, a former gymnasium and basketball court, a former bowling alley, rifle and pistol ranges, and a subterranean parking/vehicle storage space. The company rooms on the upper levels are largely comprised of living quarters, office/administrative space, dining and entertainment rooms (including a library, bar and sitting rooms). Below the drill floor level, the company rooms consist of work shops, nurses' aid stations, locker rooms and the boiler room.

3.4 Facility Operations

The Site is managed by Apple Industrial who currently employs two (2) full–time workers to maintain the Site. The eastern portion of the drill hall of the Armory is occupied by the City of New York Community Assistance Unit, Anti-Graffiti Task Force. The task force parks vehicles on the Site and occupies several offices. Turner Construction maintains office space in the Armory but does not have any employees currently on Site.

The Armory was home to the New York National Guards 258th Field Artillery Unit until 1984 when the unit relocated to the smaller 2-story building located at 10 West 195th Street. The New York City Department of Homeless Services operated a woman's shelter at 2727 Jerome Avenue; in the northeastern portion of the Site until mid-2000.

3.5 Adjacent Properties

The buildings and land use types surrounding the site are as follows:

- North: West 195th Street, Public School 86 and Walton High School.
- South: Retail, commercial and residential properties located south of West Kingsbridge Road.
- East: Jerome Avenue and the New York City Transit elevated rail lines west of retail, commercial and residential properties along eastbound Jerome.
- West: Fordham Manor Reformed Church and Apartment buildings further west.

4.0 SITE HISTORY

4.1 General Site History

The Site is located in Kingsbridge Heights section of The Bronx, in an area that was developed in the middle to late 1800s. The area has since included residential, commercial, and small industrial facilities. Historical site information was obtained from historical aerial photographs, Sanborn Fire Insurance Maps, historical topographic maps and a City Directory Search. A review of these sources indicates that the Site was originally below water along the southern portion of the Jerome Park Reservoir in the late 1800s. Construction of Armory began in 1913 and was completed in 1917. A detailed description of the documents reviewed is presented below.

4.2 Historical Aerial Photographs

Historical black and white aerial photographs were reviewed for the years 1954, 1966, 1974, 1984, and 1994. The scale of the photographs prevents detailed analysis; however, the photographs do provide an overall view of history of urbanization of the Site and surrounding area. A description of each photograph is presented below. Aerial photographs are included as Appendix C.

1954 Aerial Photograph (1 inch = 750 feet)

The 1954 aerial photograph shows the Site as completely developed, but fine details cannot be identified. The surrounding areas are also completely developed.

1966, 1974, and 1984 Aerial Photographs (1-inch = 750 feet)

There are no significant changes visible at the Site or surrounding areas since the 1954 Aerial Photograph.

1994 Aerial Photograph (1-inch = 833 feet)

No significant on-site or off-site changes are visible from the previous aerial photographs.

4.3 Sanborn Fire Insurance Maps

The Sanborn Fire Insurance Map database was searched by EDR. Sanborn Maps were reviewed for the years 1896, 1901, 1914, 1950, 1978, 1981, 1984, 1989, 1991, 1992, 1993, 1995, and 1996 (Appendix D). The Sanborn Map findings are summarized below.

1896-1901 Sanborn Maps

The Site is shown to be part of the southern portion of a surface water body identified as the Jerome Park Reservoir (the reservoir was not completed until 1906). The surrounding parcels to the east, west and south are undeveloped.

1914 Sanborn Map

The Site is shown as the Armory, 8th Coast Artillery, District N. G. N. Y. (National Guard New York) in the midst of construction. The Sanborn map notes the roof over the drill room as a steel truss with asbestos on wood planking. A gate house to the Armory is depicted at the northeast corner of Reservoir Avenue and West Kingsbridge Road. The Jerome Park Reservoir, with a notation stating "not yet constructed", is shown to the north of the Site (though the reservoir was completed in 1906). No other surrounding structures are depicted on the Sanborn map.

1950 Sanborn Map

The majority of the Site remains unchanged from the previous Sanborn map; however, the gate house depicted on the 1914 Sanborn map is no longer present and a small outbuilding is present off the northeast corner of the Armory. West 195th Street, Public School 86 and Walton High School are shown in the area previously depicted as the site of the Jerome Park Reservoir. The elevated train station at the corner of West Kingsbridge Road and Jerome Avenue is shown as under construction. Properties located east, west and south of the Armory are not depicted on the 1950 Sanborn map.

1978 Sanborn Map

The 1978 Sanborn map shows the 2-story building located at 10 West 195th Street and states that it was constructed in 1958. The map indicates that the building was used as lockers (first floor) and classrooms (second floor). This building currently houses the New York National Guards 258th Field Artillery Unit. The Armory garage located to the west of this building is also shown. However, no construction date for the garage is provided. There are no visible changes to the properties north of the Site.

1981-1984 Sanborn Maps

There are no visible changes to the Site or adjacent lots on the Sanborn Maps for this period.

1989 Sanborn Map

There are no visible changes to the Site from the previous Sanborn maps. The map identifies an iron structure containing additional classrooms (likely a prefabricated building) was constructed east of Public School 86, north of the Site.

1991-1993 Sanborn Maps

There are no visible changes to the Site or adjacent lots on the Sanborn maps for this period.

1995-1996 Sanborn Maps

There are no visible changes to the Site from the Sanborn maps. An Air Balloon Gym is shown on these maps east of the Public School 86 addition first depicted on the 1989 Sanborn map.

4.4 Historical Topographic Maps

Historical topographic maps (USGS 7.5 minute Quadrangle sections) were obtained from EDR, and were reviewed for the years 1897, 1947, 1966, 1979 and 1995. A brief description of each map and the scale is presented below. The maps are included as Appendix E.

1897 Topographic Map (1:62,500)

The Site is shown to be within a surface water identified as the Jerome Park Reservoir (which was completed in 1906). The land surrounding the reservoir is shown as mostly undeveloped.

1947 Topographic Map (1:25,000)

The southern portion of the Jerome Park Reservoir appears to have been filled in and the Site is shown on this map and depicted as the 27th Tank Company Armory. The surrounding areas are shown as completely urbanized and Public School 86 and Walton High School are depicted to the north of the Site.

1966-1995 Topographic Maps (1:24,000)

No significant changes are visible at the Site on any of these maps. The garage building appears on the 1966 and subsequent maps; however, the 2-story building at 10 West 195th Street is not shown on any of these maps. No changes to the properties surrounding the Site are shown on these maps.

4.5 City Directory Search

A City Directory Search was conducted for the years 1927 - 2000, using 1 West Kingsbridge Road as the center point of the search (Appendix E). The Site address was not listed in the research sources. A search of the neighboring properties identifies retail and commercial businesses at addresses located along East and West Kingsbridge Roads and Jerome Avenue.

4.6 Environmental Lien Search

The EDR Environmental Lien Search Report (Appendix F) is intended to assist in the search for environmental liens filed in land title records. The environmental lien search indicates that there are no liens on the Site.

4.7 Historical Information Concerning Adjacent Properties

Limited site-specific information on the history of the adjoining properties was available through the Sanborn maps, aerial photographs, the city directory search, and historical topographic maps. The majority of the area surrounding the Site since the turn of the twentieth century has been and remains residential, retail and commercial in character.

5.0 REGULATORY AGENCY DATABASE REVIEW

EDR conducted a regulatory file review for the Site and surrounding areas. The search radius for the database review was centered on a point located at 29 West Kingsbridge Road at the coordinates 40° 52' 3.0" N, 73° 53' 51.0" W. A copy of the EDR report is provided in Appendix B. The Phase I ESA discusses only those facilities identified by EDR in the databases searched as of the last agency contact date, and at the distances from the property boundary noted below. The databases were searched and selected by EDR based on the requirements of ASTM E1527-05.

Federal Database Records

- National Priority List ("NPL") for both existing and deleted facilities within a 1-mile boundary of the Site as of April 19, 2006.

- Proposed NPL, sites proposed for inclusion on the NPL as of April 19, 2006.

- The NPL Deletions database for sites approximately 1 mile of the Site as of April 19, 2006. The NPL Deletions database identifies sites meeting the EPA's criteria to delete sites from the NPL per the National Oil and Hazardous Substances Pollution Contingency Plan.

- NPL Recovery database as of October 15, 1991. The NPL Liens database lists those sites where the USEPA has filed liens against real property in order to recover remedial action expenditures. The database search is for only the Site.

- Comprehensive Environmental Response, Compensation, and Liability Information System ("CERCLIS") sites located within approximately 1/2 mile of the boundary of the Site as of February 1, 2006.

- No Further Remedial Action Proposed ("NFRAP") sites located within 1/2 mile of the boundary of the Site as of February 1, 2006.

- RCRA Corrective Action Activity ("CORRACTS") of the subject property within 1 mile of the Site as of March 15, 2006. CORRACTS identifies RCRA facilities under corrective action activity.

- Resource Conservation and Recovery Information System ("RCRIS") Facilities Lists including large and small quantity generators and treatment facilities located within approximately 1/4 mile and storage, transportation, and disposal facilities located within approximately 1/2 mile of the boundary of the Site as of February 21, 2006.

- Emergency Response Notification System ("ERNS") listings for the Site as of December 31, 2005.

- The Hazardous Materials Information Reporting System ("HMIRS") as of December 31, 2005. The HMIRS database contains hazardous materials spill incidents reported to the DOT. The database search is for only the Site.

- US ENG Control as of March 21, 2006 is a listing of sites with engineering controls in place including various forms of caps, building foundations, liners and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health.

- US INST Control as of March 21, 2006 is a listing of sites with institutional controls in place including administrative measures such as groundwater use, construction and property use restrictions, and post remediation care requirements intended to prevent exposure to contaminant remaining on site.

- Department of Defense ("DOD") database include federally owned or lands administered by the DOD that have any area greater than 640 acres. This data set was last updated December 31, 2004.

- Formerly Used Defense Site ("FUDS") database as of December 5, 2005 includes properties where the US Army Corps of Engineers is actively working and will take necessary cleanup measures.

- US Brownfields database as of November 29, 2005 includes sites addressed by Targeted Brownfield Assessments ("TBA") and EPA Cooperative Agreement Recipients.

- The Superfund Consent Decrees ("CONSENT") are major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites including settlements within approximately 1 mile of the boundary of the Site. This data set was last updated December 14, 2004.

- The Record of Decision ("ROD") for sites approximately 1 mile of the Site as of December 7, 2005. The ROD documents mandate a permanent remedy at an NPL site containing technical and health information to aid in the cleanup.

- The Toxic Release Inventory System ("TRIS") Database searches for the Site as of December 31, 2003. The TRIS sites are required to complete a Toxic Chemical Release Form (Form R) for specified chemicals.

- The Toxic Substances Control Act ("TSCA") database as of December 31, 2002. The TSCA database identifies facilities that manufacture or chemical substances included on the TSCA Chemical Substance Inventory list. The database search is for only the Site.

- The FIFRA/TSCA Tracking System ("FTTS") database as of January 17, 2006. The FTTS database tracks administrative cases and pesticide enforcement actions related to the Federal Insecticide, Fungicide, and Rodenticide Act ("FIFRA"), TSCA, and Emergency Planning and Right to Know ("EPCRA") Act. The database search is for only the Site.

- SSTS database as of December 31, 2003 is the Section Seven Tracking Systems database of the FTTS, which requires all pesticide producing establishments to submit an annual report to the EPA by March 1 of each year.

- The PCB Activity Database System ("PADS") as of December 27, 2005. PADS is maintained by EPA and identifies generators, transporters, commercial storers and /or brokers and disposers of PCB's. The database search is for only the subject site.

- The Material Licensing Tracking System ("MLTS") as of February 10, 2006. MLTS is maintained by the NRC and contains a list of approximately 8,100 sites that possess or use radioactive materials and which are subject to NRC licensing requirements. The database search is for only the Site.

- The Mines Master Index File ("MINES") for sites within 1/4 mile of the Site as of November 8, 2005. MINES is maintained by the Department of Labor, Mine Safety and Health Administration to identify mining issues.

- The Facility Index System/Facility Identification Initiative Program Summary Report ("FINDS") as of January 9, 2006. The FINDS database contains both facility information and "pointers" to other sources that contain more detail. The database search is for only the Site.

- The RCRA Administrative Action Tracking System ("RAATS") database has been discontinued; however the EPA has retained a copy for historical records.

- The Biennial Reporting System ("BRS") as of December 31, 2003. The BRS is a system administered by EPA that collects data on the generation and management of hazardous wastes.

State of New York ASTM Standard Records

- The Hazardous Substance Waste Disposal Site Inventory ("HSWDS") database contains a listing of any known or suspected hazardous waste disposal sites that are within 1/2 mile of the Site. Also included are sites delisted from the Registry of Inactive Hazardous Waste Disposal Sites and non-registry sites that USEPA Preliminary Assessment ("PA") reports or Site Investigation ("SI") reports were prepared. This database is no longer maintained as a separate entity. The last update to the database was made September 1, 2002, and the last EDR contact was February 27, 2006.

- The Inactive Hazardous Waste Disposal Sites ("SHWS") database contains site records within 1 mile of the Site that are the State's equivalent to CERCLIS. The date of the last EDR contact was March 17, 2006.

- DEL SHWS is a database of sites delisted from the Registry of Inactive Hazardous Waste Disposal Sites. The latest update was made December 30, 2005.

- The Solid Waste Facilities/Landfill Sites ("SWF/LF") database contains an inventory of solid waste disposal facilities or landfills in the state within 1/2 mile of the Site. The latest update to the database was May 3, 2006.

- The Registered Recycling Facility List ("SWRCY") as of May 3, 2006. The database lists facilities that are within 1/2 mile of the Site.

- The Registered Waste Tire Storage Facility List ("SWTIRE") as of April 1, 2004. The database identifies if the Site is on the list.

- LTANKS is the Spills Information Database which includes Leaking Storage Tank Incident Reports and contains an inventory as of April 5, 2006 of reported leaking storage tanks

(above or under ground) within 1/2 mile of the Site. The causes include tank test failures, tank failures, or tank overfills. HIST LTANKS is a listing of leaking underground and above ground storage tanks. In 2002 the DEC stopped providing updates to its original Spills Information Database. The date of the last EDR contact was April 6, 2006.

- The Petroleum Bulk Storage database ("PBS UST") identifies underground storage tanks ("UST") sites with capacities ranging from 1,100 gallons to 400,000 gallons that are located within 1/4 mile of the Site. The date of the last EDR contact was May 17, 2006.

- The Chemical Bulk Storage Database ("CBS") identifies facilities within 1/4 mile of the Site that store regulated hazardous substances in USTs of any size. The date of the last EDR contact was October 24, 2005.

- The Major Oil Storage Facilities Database UST ("MOSF") identifies facilities within 1/2 mile of the Site that may be onshore facilities, or vessels, with petroleum storage capacities of 400,000 gallons or greater. The date of the last EDR contact was July 25, 2005.

- The Petroleum Bulk Storage ("PBS AST") database identifies registered aboveground storage tanks ("AST") located at the Site. The date of the last EDR contact was May 17, 2006.

- The Chemical Bulk Storage Database, AST ("CBS AST") identifies facilities within 1/4 mile of the Site that store regulated hazardous substances in ASTs with capacities of 185 gallons or greater, and/or in USTs of any size. The date of the last EDR contact was July 25, 2005.

- The Major Oil Storage Facilities Database AST ("MOSF-AST") identifies AST facilities within 1/2 mile of the Site that may be onshore facilities or vessels, with petroleum storage capacities of 400,000 gallons or greater. The date of the last EDR contact was July 25, 2005.

- NY MANIFEST as of March 1, 2006 is a database that tracks facility and manifest data.

- The Spills Information Database ("SPILLS") identifies data collected on spills within 1/8 mile of the Site that were reported to NYSDEC as required by one or more of the following: Article 12 of the Navigation Law, 6 NYCRR Section 613.8 (from PBS regs), or 6 NYCRR Section 595.2 (from CBS regs). It includes spills active as of April 1, 1986, as well as spills occurring since this date. The latest update to the database was April 5, 2006. HIST SPILLS is a listing of leaking USTs and ASTs. In 2002 the DEC stopped providing updates to its original Spills Information Database. The date of the last EDR contact was July 7, 2005.

- ENG CONTROL as of December 30, 2005 is a listing of sites with engineering controls in place including various forms of caps, building foundations, liners and treatment methods to create pathway elimination for regulated substances to enter environmental media or affect human health.

- INST CONTROL as of December 30, 2005 is a listing of sites with institutional controls in place including administrative measures such as groundwater use, construction and property use restrictions, and post remediation care requirements intended to prevent exposure to contaminant remaining on site.

- The Voluntary Cleanup Agreements ("VCP") identifies sites within 1/2 mile of the Site where private monies are being used to remediate contaminated sites to levels allowing for the sites' productive use. The program covers virtually any kind of site and contamination. The date of the last EDR contact was March 12, 2006.

- DRYCLEANERS as of June 15, 2004 is a listing of registered dry cleaning facilities.

- BROWNFIELDS as of December 30, 2005 is the New York State Brownfields site list.

- The State Pollutant Discharge Elimination System ("SPDES") for the control of wastewater and stormwater discharges in accordance with the Clean Water Act. SPDES also controls point source discharges to groundwater as well as surface waters. The last EDR contact was May 9, 2006.

- The Aerometric Information Retrieval System ("AIRS") as of December 31, 2002 includes air emissions data.

The following sections discuss EDR's findings. Only databases for which information was found are presented below.

5.1 Results of Database Search

The Site was identified by street address on the RCRIS-SQG, RCRIS-LQG, FINDS, LTANKS, HIST LTANKS and NY MANIFEST databases searched by EDR. The Site was also identified by street address as NYS DMNA OMS#31 and listed on the RCRIS-SQG and NY MANIFEST databases; however, the Site was not identified as the target property by EDR. In addition, the

annex building located at 10 West 195th Street was identified on the UST and AST databases searched by EDR. The results of the database search are presented below:

Site Name	Address	Database(s)	Comments
Kingsbridge Armory	29 West Kingsbridge Road	RCRIS-SQG FINDS NY MANIFEST	RCRIS-SQG; no violations reported. FINDS indicated that the site has other pertinent environmental activity listed on the RCRIS database; however, no additional information was presented. NY MANIFEST has an additional fifteen (19) records on file.
Kingsbridge Armory	29 West Kingsbridge Road	LTANKS HIST LTANKS	Spill No. 8802461 reported 6/17/88. No. 2 fuel oil tank failed tightness test. Report states that the last of seven tanks was scheduled for removal in 8/04. Spill closed 8/10/04. Spill No. 9211568 reported 1/7/93. Soil contamination from piping detected during tank pull. Spill closed 3/28/05. Spill No. 9308016 reported 10/1/93. Diesel tank failure reported during tank removal. 100 yards of soil stockpiled on site. Spill remains open.
NYC EDC Kingsbridge Armory	29 West Kingsbridge Road-Roof	RCRIS-LQG NY MANIFEST	RCRIS-LQG; no violations reported. NY MANIFEST has an additional seven (7) records on file.
NYS DMNA OMS #31*	29 West Kingsbridge Road	RCRIS-SQG NY MANIFEST	RCRIS-SQG; no violations reported. NY MANIFEST has an additional one (1) record on file.
NYS Armory	10 West 195th Street	UST AST	One (1) 3,000 gallon diesel and one (1) 2,000 gallon unleaded gasoline USTs reported closed-removed on 9/1/93. One (1) 2,000 gallon fuel oil UST reported in service. One (1) 8,000 gallon fuel oil UST reported closed-removed 1/1/99 and one (1) 225 gallon unleaded gasoline UST reported closed-removed on 5/1/95. One (1) 225 gallon diesel fuel AST and one (1) 275 gallon AST with "other" contents reported on site.

* - Not reported by EDR as the target property

5.2 Nearby Sites

EDR identified one hundred sixty (160) sites within the search radii of the Site. The following

identifies the sites that are within 1/4 mile of the Site and have assumed groundwater elevations equal to or higher than the Site (based upon the assumed flow direction of groundwater to the north-northeast). Sites located downgradient of the Site are not included since the potential for these sites to impact the subject property is low. Each of these is identified below with respect to the database in which they appear and the same site may be listed on more than one database.

5.2.1 RCRIS-SQG Sites

EDR identified a total of three (3) listed Small Quantity Generator ("SQG") sites within 1/4 mile of the subject Site. Of these, one (1) is listed as an alias for the Site and described in Section 5.1 and one (1) was located at an elevation equal to or higher and hydrogeologically upgradient or sidegradient to the Site with respect to the assumed groundwater flow direction. This SQG is summarized below:

Site Name	Address	Distance / Direction [1]	Comments
MTA NYCT – Kingsbridge Road Sta.	Jerome Avenue and Kingsbridge Road	0-1/8 mile E/sidegradient	No violations found.

1. Upgradient/sidegradient direction based on assumed groundwater flow direction.

5.2.2 LTANKS Sites

EDR identified forty-one (41) sites on the LTANKS database within 1/2 mile of the site. Of these, one (1) was located at an elevation equal to or higher and hydrogeologically upgradient or sidegradient to the Site with respect to the assumed groundwater flow direction and within 1/4 mile of the Site. A summary of the LTANK site is provided below:

Site Name	Address	Distance / Direction [1]	Comments
55 E. 196th Street	55 E. 196th Street	1/8-1/4 mile E/upgradient	Spill No. 9408807 reported 10/3/94. Twenty (20) gallons of #4 fuel oil reported spilled from tank overfill, spill closed 10/30/94.

1. Upgradient/sidegradient direction based on assumed groundwater flow direction.

5.2.3 UST Sites

EDR identified twenty-four (24) sites on the UST database. Of these, seven (7) were within 1/4 mile of the Site and hydrogeologically upgradient or sidegradient with respect to the assumed groundwater flow direction. One (1) of the sites is listed as an alias for the Site and described in Section 5.1. A summary of the remaining six (6) UST sites is provided below:

Site Name	Address	Distance / Direction (1)	Comments
2683 Morris Av Assoc.	2683 Morris Avenue	0-1/8 mile E/sidegradient	One (1) 4,000 gallon vaulted steel fuel oil UST reported in service. Date of installation is not reported.
2690 Morris Ave. Assoc.	2690 Morris Avenue	0-1/8 mile E/sidegradient	One (1) 5,000 gallon vaulted steel fuel oil UST reported in service. Date of installation is not reported.
Neiler Associates, LLC	2771 Morris Avenue	1/8-1/4 mile NE/upgradient	One (1) 3,500 gallon steel fuel oil UST reported in service. Date of installation is not reported.
2754 Grand Concourse	2754 Grand Concourse (2501 40th Avenue)	1/8-1/4 mile E/sidegradient	One (1) 7,000 gallon vaulted steel fuel oil UST reported in service. Date of installation is not reported.
Roban Mgmt	2784 Morris Avenue	1/8-1/4 mile NE/upgradient	One (1) 5,000 gallon vaulted steel fuel oil UST reported in service. Date of installation is not reported.
2786 Jerome Avenue	2786 Jerome Avenue	1/8-1/4 mile NNE/upgradient	One (1) 4,000 gallon vaulted steel fuel oil UST reported in service. Date of installation is not reported.

1. Upgradient/sidegradient direction based on assumed groundwater flow direction.

5.2.4 NYSPILLS Sites

EDR identified one (1) site on the Spills Information database that was within 1/8 mile of the Site. This site is located hydrogeologically upgradient or sidegradient to the Site with respect to groundwater flow. A summary of the NYSPILLS site is provided below:

Site Name	Address	Distance / Direction (1)	Comments
2683 Morris Av Assoc.	2683 Morris Avenue	0-1/8 mile E/sidegradient	Spill No. 0005691 reported on 8/11/00 and closed 8/25/05. Con Ed reported fuel oil contaminated soil found during gas line replacement. The site was reported to have recently had the fill line replaced.

1. Upgradient/sidegradient direction based on assumed groundwater flow direction.

5.2.5 Orphan Sites

Orphan sites are those having limited address information that precludes mapping the site. One hundred forty six (146) unmapped sites were identified by EDR. Orphan sites are listed in the EDR report found in Appendix B. One (1) orphan site found on the NY MANIFEST database

was listed as United States Military-Kings Bridge and may be associated with the Site. One (1) additional orphan site, NYC BOE-Walton HS is located approximately 1/8 mile north of the Site. This site was identified on the NY MANIFEST, FINDS and RCRA-SQG databases. However, the database report did not provide any specific information each of the sites. No additional orphan sites were identified during the site reconnaissance.

6.0 AGENCY REVIEW

M&E contacted several city, borough, and state officials to determine whether they had any knowledge of the Site or environmental concerns in the vicinity of the Site. A brief summary of M&E's correspondence is presented in the following sections, with copies of FOIL requests included in Appendix H and downloaded New York City Department of Buildings ("DOB") information included in Appendix I.

6.1 City/Borough Agencies

The following is a summary of information obtained from several local regulatory agencies.

Fire Department of the City of New York

A Records Search Request was submitted to the Fire Department of the City of New York ("FDNY") for any records related to heating oil tanks and USTs. No response from the FDNY has been received to date.

New York City Department of Buildings

M&E performed a search on the Buildings Information Search ("BIS") on the DOB website on August 3 and 14, 2006. The BIS indicated that there are two Building Information Numbers ("BINs") for the Site at Block 3247 Lot 2. BIN 2098782 corresponds to the 2 West 195th Street address and lists five (5) active DOB violations. BIN 2098784 corresponds to the 29 West Kingsbridge Road address and lists forty-five (45) total Actions at the site. These actions include building notices, miscellaneous, curb cut, elevator, fire protection plans, public assembly, permit, Special Reports and plumbing repair slips. In addition, there are six (6) complaints, eighteen (18) DOB violations, and three (3) ECB violations. All six (6) complaints are reported to be resolved. Of the eighteen (18) DOB violations, seventeen (17) are for boiler violations, and one (1) for a construction violation. All DOB violations remain active. Two (2) of the three (3) ECB violations remain open, failure to maintain exterior building wall has been resolved.

New York City Department of Health and Mental Hygiene

A FOIL letter was submitted to the Records Access Officer of the New York City Department of Health and Mental Hygiene ("NYCDHMH") by M&E on July 20, 2006 requesting a file search for the Site. No response from the NYCDHMH has been received to date. M&E will immediately notify the EDC should the NYCDHMH provide information indicating the presence of additional environmental concerns at the Site.

New York City Department of Environmental Protection

A FOIL letter dated July 20, 2006 was submitted to Mr. Frank Schiano, legal advisor to the New York City Department of Environmental Protection ("NYCDEP") and the New York City Department of Environmental Health ("NYCDEH"). To date, no response has been received from the NYCDEP or the NYCDEH. M&E will notify EDC if additional site information is provided by this agency.

6.2 State Agencies

New York State Department of Environmental Conservation

A FOIL letter was submitted to the Records Access Officer of the New York State Department of Environmental Conservation ("NYSDEC") by M&E on July 20, 2006 requesting a file search for the Site. NYSDEC has not yet replied to M&E. Should any environmental concerns be noted by the NYSDEC in their reply, M&E will immediately notify the EDC.

7.0 CLIENT PROVIDED INFORMATION

M&E requested that the EDC provide copies of all available information related to the subject site or surrounding area. Mr. Daniel Bruen of Turner Construction was contacted and provided a copy of the ET Environmental Corporation (September 15, 2000) *Kingsbridge Armory Roof Rehabilitation Project Environmental Survey Report*. The report consisted of an asbestos survey report and removal specifications, a LBP survey report and removal specifications and a survey of biological contamination (bird droppings). The findings of the report were used to determine the environmental conditions and potential impacts to scheduled roof renovation activities.

8.0 SITE RECONNAISSANCE

Mr. Ronald Kantor of M&E accompanied by Mr. Carl Gregg of Apple Industrial (an EDC subcontractor) conducted the site reconnaissance on June 30, 2006. A photographic log is located in Appendix J.

8.1 Methodology and Limiting Conditions

Performance of the Phase I ESA was limited to visual inspection of the Site. The Site was completely accessible with the exception of certain rooms in the towers where the floors were compromised from water damage and the floor of the theater and the basement boiler room, both of which were flooded at the time of the site visit.

8.2 Site Conditions

The Site is accessible from a gated entrance off Reservoir Avenue. Entrance to the Armory is monitored by a security guard stationed in a guard shack located at the Reservoir Avenue entrance. All remaining entrances to the Armory are locked and the Armory is surrounded by chain-link security fence. Access to the 2-story annex building is along West 195th Street, and the National Guard garage building west of the annex is also fenced. Grassy areas are present along the northern, southern and western perimeters of the Site; however, the western portion is mostly paved and utilized for parking and access to the Armory drill floor. The eastern portion of the Armory abuts the sidewalk of northbound Jerome Avenue.

Major roof renovations to the metal and glass roof spanning the drill hall and to the flat roof behind the parapets above the company rooms located south of the drill hall were conducted between 2000 and 2005.

Three (3) levels exist beneath the poured concrete drill hall floor, which was originally an earthen floor. These levels include additional company rooms and work shops; a theater and lecture hall; a former gymnasium and basketball court; a former bowling alley; rifle and pistol ranges; and, subterranean parking/vehicle storage space. Peeling paint and mold were prevalent throughout the subterranean levels. Trash and debris is also present in many of the smaller company rooms as well as used clothing left by the former Woman's Shelter. Standing water is present on the former theater/lecture hall floor and is currently pumped to the sanitary sewer. Standing water is also present in the lower level parking/vehicle storage area.

Two (2) 275 gallon fuel oil ASTs located two (2) levels below the drill hall in the southwestern portion of the Armory, east of the former bowling alley. The tanks did not appear to contain significant amounts of product. An additional 275 gallon fuel oil AST was observed on the drill hall floor in the northeastern portion of the Armory and also did not appear to contain a significant amount of product. A petroleum odor was detected in room B-20 located on the first level below the drill floor in the western portion of the building; however, no source for the odor could be located. Several 5-gallon pails of Esguard LubraKote Black, a flashing cement, were observed in several of the rooms on the second level below the drill hall in the western portion of the Armory. Cans of motor oil, brake fluid and other petroleum-based lubricants as well as empty gasoline cans were observed in the motor pool workshops located along the northern portion of the company rooms on the mezzanine of the second level below the drill floor. Ten (10) 55-gallon steel drums were observed in the lower level parking/vehicle storage area. The drums show signs of deterioration with rust and holes in several of the drums. The content of the drums is unknown, although most appear to be empty.

Three (3) earthen floored rifle and pistol ranges were observed on the Site and are suspected to contain elevated concentrations of lead from spent munitions. The first pistol range is located on the second level below the motor pool workshops. Spent munitions were observed embedded in the wooden walls of pistol range. The other pistol/rifle ranges are located on the third level below the drill floor in the eastern portion of the building near Jerome Avenue. No spent munitions were observed at these ranges.

On-site equipment such as the boiler located in the southwestern portion of the basement of the company rooms and air conditioning units located in the northeastern portion of the Armory, one (1) level beneath the drill hall are deteriorating and appear to be no longer functional.

The company rooms and tower rooms in the southern portion of the Site are largely comprised of living quarters, office/administrative space, dining and entertainment rooms (including a library, bar and sitting rooms). The upper floors of the company rooms are significantly water damaged with walls, floors and ceilings beginning to or already collapsing. Peeling paint, mold and trash and debris are prevalent throughout the company rooms. The boiler room, located in the lowest level in southwestern portion of the company rooms, is flooded. The boiler is no longer operational. An electrical panel was reported to have fallen into a large puddle of water on the boiler room floor. Con Ed responded by taking the electrical panel off-line and ran emergency lighting in the boiler room.

8.3 Site Utilities

The Armory is served in a limited electrical service. The National Guard building is served by electric, natural gas, sewer and water. Public utility features observed in the street and sidewalk areas indicate that the area is served by Con Edison (electricity), Keyspan Energy (natural gas), the NYCDEP (sewer, water), and Verizon (telephone).

8.4 Site Drainage

The site is located within the City's Ward's Island Drainage Area, and is served by the water pollution control plant of the same name. Under normal conditions, drainage from the Site is collected in the surrounding combined sewers, and treated at the plant prior to discharging to the East River.

8.5 Underground and Aboveground Storage Tanks

Three (3) 275 gallon fuel oil ASTs were observed at the Site during the site reconnaissance. The ASTs appear to be in fair to good condition with some surface oxidation and peeling paint observed on the two (2) tanks located in the vicinity of the former bowling alley. The ASTs did not appear to contain significant amounts of product. In addition, the center of the parking/vehicle storage area was observed to have been saw cut and backfilled with sand. This area may have once contained a UST.

8.6 Oil-Filled Equipment

The boiler and air conditioning units located in the northeastern portion of the Armory, one (1) level beneath the drill hall units may contain residual fuel oil and lubricating oils.

8.7 Hazardous Materials and Petroleum Storage

Peeling lead-based paint ("LBP"), light ballasts possibly containing polychlorinated biphenyls ("PCBs"), and potential asbestos containing materials ("ACM") including pipe wrap and floor tiles are most likely present. Residual fuel oil may be present in the three (3) ASTs. Cans of motor oil, brake fluid and other petroleum-based lubricants as well as empty gasoline cans were observed in the motor pool workshops located along the northern portion of the company rooms on the mezzanine of the second level below the drill floor.

8.8 Waste Generation

Solid wastes generated at the Site are collected by the New York City Department of Sanitation.

8.9 Neighboring Properties

Neighboring properties include PS 86 and Walton High School to the north; retail, commercial and residential properties east along Jerome Avenue and south along West Kingsbridge Road; and, the Fordham Manor Reformed Church and Apartment buildings west of the Site.

9.0 INTERVIEWS WITH FACILITY PERSONNEL

Charles Braswell and Carl Gregg of Apple Industrial provided information regarding the current operations of the Site and additional background information regarding the basement boiler room flooding and electrical panel failure for this Phase I ESA.

10.0 FINDINGS AND CONCLUSIONS

An environmental database provided by EDR identified sites within the search radii where documented environmental impacts have occurred. Although the EDR database information did not include any documentation from which it could be concluded that the sites identified within the search radii have impacted the Site, it is possible that groundwater under the Site has been impacted due to the industrial/commercial use of the surrounding area, and by potential contamination in on-site fill materials. However, it should be noted that the groundwater in this area is not used as a potable source.

During the Phase I ESA, a visual inspection of the Site was performed. The visual inspection identified three (3) 275 gallon fuel oil ASTs. One (1) tank is located in the northeast corner of the building on the drill hall floor; the two (2) remaining tanks are located two (2) levels below the drill hall in the southwestern portion of the building, east of the former bowling alley. None of the tanks appeared to contain significant amounts of product. A petroleum odor was detected in room B-20 located on the first level below the drill floor in the western portion of the building; however, no source for the odor could be located. Several 5-gallon pails of Esguard LubraKote Black, a flashing cement, were observed in several of the rooms on the second level below the drill hall in the western portion of the building. Cans of motor oil, brake fluid and other petroleum-based lubricants as well as empty gasoline cans were observed in the motor pool workshops located along the northern portion of the company rooms on the mezzanine of the second level below the drill floor. Ten (10) 55-gallon steel drums were observed in the parking/vehicle storage area located three (3) levels below the drill hall floor. The drums are beginning to show signs of deterioration with rust and holes present in several of the drums. The content of the drums is unknown, although most appear to be empty. In addition, possible oil staining of the concrete near the center of the parking/vehicle storage area was observed as well as an area where the concrete floor was saw cut and backfilled with sand. This area may have once contained a UST.

Three (3) earthen floored rifle and pistol ranges were observed on the Site and are suspected to contain elevated concentrations of lead from spent munitions. The first pistol range is located on the second level below the motor pool workshops. Spent munitions were observed embedded in the wooden walls of pistol range. The other pistol/rifle ranges are located on the third level below the drill floor in the eastern portion of the building near Jerome Avenue. No spent munitions were observed at these ranges.

Deteriorating equipment such as the boiler located in the southwestern portion of the basement of

the company rooms and air conditioning units located in the northeastern portion of the Armory, one (1) level beneath the drill hall may contain asbestos, lubricating oils and refrigerants. Peeling paint that may contain lead, light ballasts possibly containing PCBs, potential ACM including pipe wrap and floor tiles and extensive mold growth was present in the majority of the company rooms located along the southern portion of the Armory and the company rooms beneath the drill hall. In addition, water damage to the walls, ceilings and floors of the upper level company rooms and turret rooms is prevalent.

In September 2000, ET Environmental submitted an Environmental Survey Report to the EDC prior to the roofing renovations to determine the presence of ACM, LBP and bird droppings. Samples collected in the vicinity of the work areas indicated non-friable asbestos and LBP were present on the Site. Additional sampling for ACM, LBP and a light ballast survey are recommended for the company rooms and the levels beneath the drill hall. A survey of the 55 gallon drums should be conducted to include an inventory of the drums and a determination of the contents of the drums. Once completed, the drums and their contents should be properly disposed. It is also recommended that the three (3) ASTs be removed as well as the petroleum products in the motor pool workshops and the lower levels beneath the drill hall. Deteriorating equipment should also be properly removed from the site. In addition, the earthen floors of the pistol and rifle ranges should be remediated and the spent rounds from the walls of the second level pistol range should be removed due to the potential presence of lead.

Additional recommendations could be warranted should potential environmental issues be identified by outstanding FOIL/Information requests submitted to the New York City Department of Environmental Protection, the New York City Department of Health, and the New York State Department of Health.

Ronald W. Kantor
Senior Scientist

Nelson J. Abrams, P.G.
Project Manager

11.0 STATEMENT OF LIMITATIONS

The data presented and the opinions expressed in this report are qualified as follows:

1. The sole purpose of the investigation and of this report is to assess the physical characteristics of the Site with respect to the presence or absence in the environment of oil or hazardous materials and substances as defined in the applicable state and federal environmental laws and regulations and to gather information regarding current and past environmental conditions at the Site.

2. Metcalf & Eddy (M&E) derived the data in this report primarily from visual inspections, examination of records in the public domain, and interviews with individuals with information about the Site. The passage of time, manifestation of latent conditions or occurrence of future events may require further exploration at the Site, analysis of the data, and reevaluation of the findings, observations, and conclusions expressed in the report.

3. In preparing this report, M&E has relied upon and presumed accurate certain information (or the absence thereof) about the Site and adjacent properties provided by governmental officials and agencies, the Client, and others identified herein. Except as otherwise stated in the report, M&E has not attempted to verify the accuracy or completeness of any such information.

4. The data reported and the findings, observations, and conclusions expressed in the report are limited by the Scope of Services. The Scope of Services was defined by the requests of the Client, the time and budgetary constraints imposed by the Client, and the availability of access to the Site.

5. Because of the limitations stated above, the findings, observations, and conclusions expressed by M&E in this report are not, and should not be considered, an opinion concerning the compliance of any past or present owner or operator of the site with any federal, state or local law or regulation. No warranty or guarantee, whether express or implied, is made with respect to the data reported or findings, observations, and conclusions expressed in this report. Further, such data, findings observations, and conclusions are based solely upon site conditions in existence at the time of investigation.

6. This report has been prepared on behalf of and for the exclusive use of the Client, and is subject to and issued in connection with the Agreement and the provisions thereof.

7. The Phase I ESA was performed using standard engineering practices, with the understanding that environmental professionals can and should use their professional judgment in carrying out environmental site assessments.

12.0 REFERENCES

Baskerville, Charles A. *Bedrock and Engineering Geologic Maps of Staten Island County and Parts of New York and Queens Counties, New York* 1992 United States Geologic Survey

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PHASE II ENVIRONMENTAL SITE ASSESSMENT REPORT

Kingsbridge Armory
Block 3247, Lot 2
Bronx, New York 10468

TRC Project Number: 113429.0120.0000

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September 19, 2007

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1.0 INTRODUCTION

This Phase II Environmental Site Assessment (Phase II ESA) Work Plan details the investigation activities and methodologies implemented at the Kingsbridge Armory Site (refer to Site Description below). This Work Plan was prepared by TRC Environmental Corporation (TRC) on behalf of the New York City Economic Development Corporation (NYCEDC). As documented by previous environmental reports and a site visit by TRC, there are recognized environmental conditions (RECs) and environmental concerns associated with the Site that were evaluated under the Phase II ESA. The overall objective of the Phase II Environmental Site Assessment (Phase II ESA) was to assess the potential presence and nature of Site contamination not including lead based paint, asbestos containing materials, mold, or hazardous building materials (e.g., fluorescent bulbs, ballasts) associated with the property.

1.1 Site Description

The Site is an approximately 5-acre parcel encompassing four city blocks and consisting of a Romanesque-style fortress (the "Armory"), two smaller annex buildings located to the north of the Armory, and paved parking area at the west end of the Site. The legal description for the Site is Block 3247, Lot 2. The Site is bounded by West 195th Street to the north, Jerome Avenue to the east, Kingsbridge Road to the South, and Reservoir Avenue to the west.

The Armory is comprised of over 475,000 square feet of space, with a main drill hall occupying most of the ground floor and three levels below the drill hall. The lower levels of the Armory include rifle and pistol ranges, subterranean parking, and open storage space. A one-story brick Annex building is located to the north of the Armory, near the intersection of Reservoir Avenue and West 195th Street, and is used for vehicle storage (the "Maintenance Building") by the National Guard. A two-story brick Annex Building is located to the north of the Armory, at 10 West 195th Street, and is used as a recruiting office for the National Guard.

Figure 1 shows the general location of the Site. Figure 2 shows site layout and the boundaries of property.

1.2 Site History

The Phase I ESA Sanborn fire insurance maps from 1914 to 1996 indicate that the Site was developed since at least 1914 and occupied by the 8th Coast Artillery, District N.G.N.Y. (National Guard of New York). According to the Phase I Environmental Site Assessment (Phase I ESA) report dated September

2006 and prepared by Metcalf and Eddy, Inc. (M&E) for EDC, construction of the Armory began in 1913 and was completed in 1917. A 1978 Sanborn map presented in the Phase I ESA indicates that the adjacent two-story Annex building was constructed in 1958. The adjacent Annex garage building is also shown on this Sanborn map; however, there is no construction date indicated on the map for the building.

1.3 Future Use of the Site

The planned redevelopment of the Site includes a mixed-use of community space, schools, department store, movie theatre, parking garage, and a YMCA. The proposed future development plans will require extensive renovation of the existing Armory and Annex Buildings currently located at the Site.

2.0 PREVIOUS STUDIES

As previously indicated, M&E prepared a Phase I ESA report for the Kingsbridge Armory dated September 2006 on behalf of NYCEDC. The Phase I ESA made no conclusions with regards to the presence or absence of RECs at the Site. However, the following findings in the Phase I ESA report can be interpreted as representing RECs or environmental concerns for the Site:

- An area of the concrete floor on the lowest level of the Armory appeared to be saw cut and backfilled with sand. The Phase I ESA concluded that this area represent a possible location where an underground storage tank (UST) had been removed. The former presence of a UST at this location represents an REC; however, TRC was unable to find this location and any records concerning the prior presence of an UST at this location.
- The three earthen floor indoor shooting ranges within the Armory potentially have spent lead-containing shells. The presence of lead-containing shells within the Armory represents an environmental concern.
- Three 275-gallon fuel oil aboveground storage tanks (ASTs) were identified in the Armory. One tank is located in the northeast corner of the drill hall floor and the other two are located two levels below the drill hall floor in the southwestern portion of the building, east of the former bowling alley. TRC observed the one AST located on the drill hall floor during our site visit. This tank still contained diesel fuel for an emergency generator that was no longer operable. The tank appeared to be in good condition with no signs of leaks. The other two tanks were observed to be in the subbasement and appeared empty with no signs of leaks; however, access to the tanks was limited due to the presence of surrounding debris and standing water.
- Ten 55-gallon steel drums were reported in the parking/vehicle storage area located three levels below the drill hall floor. The drum's contents were reported as unknown and most free of liquids. During TRC's site visit, several empty drums were observed in this area with no signs of potential releases.
- Suspected peeling lead based paint, potential polychlorinated biphenyl (PCB) containing light ballasts, potential asbestos containing materials (ACM) including pipe wrap and floor tiles, and extensive mold growth were noted present in portions of the Armory.

Naeva Geophysics Inc. (Naeva) prepared a geophysical survey report on behalf of ATC Associates, Inc., dated August 18, 2000. The geophysical survey report identified the following current and former locations of USTs that represent RECs:

- An abandoned fill port and vent pipe were located along the western exterior of the Armory, and the geophysical survey traced the lines associated with the vent pipe and fill port to a nearby 12-foot by 15-foot area where the asphalt pavement had been removed. The geophysical survey found no evidence of buried metal at this location, and the report interpreted the area to represent a former UST location.
- A 30-foot by 30-foot area of reinforced pavement is located along the western exterior of the Armory and to the south of the aforementioned former UST location. The geophysical survey detected elevated electromagnetic (EM) response at this location, and the report interpreted the geophysical anomaly to represent a potential UST location.
- Two vent pipes were observed along the western perimeter of the Maintenance Building to the north of the Armory. The geophysical survey traced the lines associated with the vent pipes to two areas where the concrete pavement had been patched. Although the findings of the geophysical survey were inconclusive regarding USTs at these locations due to interference from metal objects on the surface (i.e., cars and metal dumpsters), the geophysical survey report interpreted each of the patched areas to represent a potential UST location.

3.0 SCOPE AND METHODOLOGY

From July 18, 2007 to August 6, 2007, TRC conducted a Phase II ESA at the Site. The overall scope and methodologies of TRC's Phase II ESA is consistent with the Phase II ESA Work Plan dated July 2007. Photographs documenting implementation of the Phase II ESA are presented in Appendix B.

3.1 Scope of Phase II ESA

TRC's Phase II Environmental Site Assessment included the following:

- Geophysical survey at suspected historic underground storage tank (UST) locations and planned drilling locations (buried utility clearance),
- Test pit excavations at two of the three historic tank locations,
- Completion of 13 soil borings around historic UST locations,
- Installation of 4 permanent groundwater monitoring wells around historic UST locations,
- Collection of 18 soil samples from 15 locations at the indoor shooting ranges, and
- Collection of 14 soil boring samples and 4 groundwater samples for laboratory analysis in response to the aforementioned recognized environmental conditions,

The scope of each of these elements is described in the subsections below.

3.2 Geophysical Survey

The results of the prior Naeva geophysical investigation and TRC's site visits indicated evidence of several potential USTs along the western perimeter of the Armory and Maintenance Building. In addition, the Phase I ESA identified a potential UST location within the lowest level of the Armory. However, this location was not evident in the field and therefore could not be investigated further.

The primary objective of the geophysical survey was to identify the presence of historic USTs and to assess planned subsurface sampling locations for underground utilities. Enviroprobe conducted a subsurface geophysical investigation at the subject property at the suspect UST locations under the direction of TRC. The investigation utilized a Mala Geoscience Ramac X3M cart-mounted Ground Penetrating Radar (GPR) unit, a Radiodetection PDL2-4M multi-frequency receiver and transmitter (Radiodetection), and a Fischer Scientific TW-6 metal detector.

The penetration depth of the GPR unit varies from several inches to tens of feet according to site-specific conditions. The penetration depth decreases with increased soil conductivity. The penetration depth is the greatest in ice, dry sands and fine gravels. Clayey, highly saline or saturated soils, areas covered by steel reinforced concrete, foundry slag, of other highly conductive materials greatly reduced GPR penetration. The Radiodetection receiver and transmitter are commonly used for pipe and cable locating. These instruments were used to identify suspect USTs, buried pipelines and other potential subsurface structures of concern.

The two historic UST locations at Kingsbridge Armory west of the Maintenance Building are covered by reinforced concrete, thereby limiting the effectiveness of the geophysical survey equipment to locate the USTs. At a third suspect UST location that corresponds with an area that Naeva had previously indicated where asphalt pavement had been removed and a fill and vent pipe were present, and the geophysical survey found no evidence of buried metal. A small guard booth for the Armory is currently present at this location. The guard booth was installed by NYCEDC at this location in the Summer of 2003 and is constructed of metal frame and siding on a concrete slab. The previously identified flush-mounted steel fill pipe for this location is still present in the asphalt just south of the Guard Booth and inscribed with the words GASOLINE along its rim. At the 30-foot by 30-foot area of reinforced concrete pavement previously identified by Naeva and located along the western exterior of the Armory to the south of the aforementioned former UST location, there are no signs of potential USTs (e.g., fill pipe, vent pipe, manway) and no known historic USTs at this location associated with the Armory. Furthermore, TRC believes that this slab may be related to a former below-grade pump house reported in this area for the Jerome Reservoir previously located on the Armory site.

Numerous utilities including water, sewer, gas, and electric are also located near the UST locations and planned soil boring/well locations. Some soil boring and well locations were adjusted to avoid buried utilities to assure safe working conditions.

3.3 Test Pits

Following the completion of the geophysical surveys, test pit excavations were completed at two of the three historic UST locations by American Environmental under contract to TRC to assess the presence of an UST. Based on the test pitting findings at the two locations, TRC was able to confirm the presence of two abandoned USTs west of the Maintenance Building. Concrete slabs over the tank locations were marked with the numbers "94" along with several individual names likely indicative of the date that the slabs were poured (i.e., tanks closed) and the persons that did the work. After removing a portion of the slab and underlying soils to expose the tanks, it was determined that the top of each steel UST had been cut open and filled with a gravel/sand mixture. The gravel/sand in the tanks appears to have settled and

as a result a void space in the top of each tank appears to have filled with rain water that had penetrated cracks in the surface concrete and collected in the void space inside the tanks. The water, sand and gravel were visually observed and field screened with a PID and there were no signs of any petroleum impacts. TRC did not collect soil or water samples from the test pit locations. The test pits were backfilled with removed material and the removed overlying concrete slab area was filled to grade with recycled concrete/aggregate material brought to the site by American Environmental. The concrete slab debris from each test pit location was removed from the site and disposed of offsite.

3.4 Soil Sampling and Analysis/UST Investigation

The primary objective of the soil sampling was to assess overall soil conditions at the three known historic UST locations. As shown on Figure 4, TRC advanced thirteen soil borings, corresponding to four borings at each of the known existing and former UST locations and one additional boring (SB-13) near one boring location (SB-12) where an elevated PID soil reading was measured at the bottom of boring and the boring was terminated due to refusal.

A vehicle-mounted, hydraulically-powered machine (Geoprobe® Model 6600) using static force and percussion advanced small-diameter tools into the subsurface to collect soil samples at each soil boring location. At each location, an attempt was made to advance a soil boring to the water table utilizing the direct push unit. At several boring locations, shallow refusal was encountered before groundwater. At least one boring location per UST location was completed to groundwater. All soil boring samples were continuously collected at 5-foot intervals and field screened for volatile organic compounds (VOCs) and signs of potential petroleum contamination to the water table, utilizing a PID and field observations (e.g., staining, odors, etc.). Geologic descriptions of the soil and field screening results were recorded in field logs. Appendix C contains the soil boring logs prepared by TRC.

At a minimum, one sample was selected from each boring for laboratory analysis from depths exhibiting evidence of potential contamination (e.g., odors, staining, PID readings). If there were no indications of potential contamination, the soil samples for analysis were either collected from the sampling interval above the inferred depth of the water table or the deepest interval prior to refusal. Selected discrete soil samples were analyzed for the following parameters:

- Target Compound List Volatile Organic Compounds (TCL VOCs),
- Target Compound List Semivolatile Organic Compounds (TCL SVOCs),
- Target Compound List Pesticides/Polychlorinated Biphenyls (TCL pesticides/PCBs) and
- Target Analyte List Metals (TAL Metals)

Samples were containerized in accordance with EPA analytical protocols. Each container was properly labeled and placed in an iced cooler for transport to the laboratory. A chain-of-custody was completed in the field and accompanied the samples to the laboratory.

3.5 Groundwater Sampling and Analysis

A conventional hollow-stem auger rig was used to install four, two-inch diameter permanent groundwater monitoring wells at the Site. The initial scope of work called for 5 wells to be installed; however, due to the greater than anticipated depth to groundwater and numerous obstructions (cobbles, boulders, etc) that were encountered during the drilling, only four groundwater wells were able to be installed. Groundwater depth ranged from 26.69 feet (ft) below top of well casing (BTOC) to 29.88 ft BTOC in MW-1. The wells are flush-mounted wells with the top of casing located slightly below the adjacent grade. Groundwater flow direction is to the south west. Figure 4 shows the surveyed groundwater depth as well as the groundwater flow direction.

Groundwater monitoring wells were constructed of threaded Schedule 40 PVC well casing and 20-slot well screen. The wells were screened approximately 10 feet above the water table and 10 feet below the water table. Clean silica sand, Morie No. 2, or equivalent, was placed in the annular space around the well screen to a minimum of one foot above the top of the well screen, two feet being optimal. A two-foot bentonite seal was placed above the sand pack and hydrated with potable water. A portland cement/bentonite grout (6:1 ratio) was placed the well annulus up to 12 inches below grade only after the underlying bentonite seal was fully hydrated. A concrete ground surface seal or apron was installed 12 inches deep and surrounding the well at least 6 inches wide and sloped flush to surrounding paved surfaces. An 8-inch diameter protective flush-mounted steel surface manhole marked MONITORING WELL with a bolted cover was securely set in the concrete with a 12-inch steel skirt over the PVC well casing. A locking well cap with a keyed-alike brass lock was provided for each well. Well construction diagrams were prepared by TRC for each well and are located in Appendix C.

Following development, the wells were allowed to equilibrate for seven days prior to groundwater sampling. The volume of water removed, the well development time, and field instrument readings were recorded. Groundwater development and sample logs are located in Appendix D.

Just prior to sampling the new groundwater monitoring wells, the wells were purged utilizing a low-flow submersible stainless steel pump and dedicated polyethylene tubing connected to a flow-through cell for monitoring water quality parameters. The submersible pump was decontaminated prior to sampling utilizing a solution of deionized water and Alconox detergent. Low purging rates were used to minimize suspension of particulate matter in the well. Field parameters including temperature, conductivity, pH,

turbidity, and dissolved oxygen (DO) were recorded during purging and before sampling. Prior to sampling, the goal of within ±10 percent for two consecutive readings for the field parameters was attained at each location. After completing purging, groundwater samples were collected with the low-flow submersible pump and dedicated disposable polyethylene tubing.

The locations and elevations of the tops of casings of all groundwater monitoring wells at the Site were surveyed by a New York State licensed land surveyor under contract to NYCEDC.

The groundwater samples were analyzed for the following parameters:

- TCL VOCs,
- TCL SVOCs, and
- TAL Metals (filtered and unfiltered).

Samples were containerized in accordance with EPA analytical protocols. Each container was properly labeled and placed in an iced cooler for transport to the laboratory. A chain-of-custody was completed in the field and accompanied the samples to the laboratory.

3.6 Surficial Soil Sampling/Shooting Ranges

Soil samples were collected from the three separate rifle/pistol shooting ranges located on the interior lower levels of the Armory. Dedicated, decontaminated stainless steel spoons were utilized to collect the soil samples at each of the shooting ranges, and samples were collected from multiple depths in each area. The soil samples were collected from 0 to 1.5 feet below ground intervals. A total of eighteen (18) soil samples were collected for total lead analysis from the five pistol shooting ranges and one rifle shooting range. Several of the samples were also screened in the field with a No. 5 sieve (4 mm or 0.157 inch opening to remove large pieces of lead shot. Based on the total lead sample results, eleven (11) of these soil samples were analyzed for TCLP leachable lead for waste disposal characterization. The locations of the soil sampling associated with the shooting ranges are shown on Figure 5.

Additional lead impacted material disposal will be necessary in the pistol range containing SB-I/9, SB-J/10, and SB-P/16. The wall on the west end of this firing rang is composed of wood (approximately 840 cubic ft) containing lead shot. The location of the wooden wall is shown on Figure 5.

3.7 Waste Management

Investigation derived wastes (IDW) are waste materials that was generated during the Phase II site investigation. The IDW included boring soil, well development and purge groundwater,

decontamination liquids, and personal protective equipment (PPE). Following groundwater well installation, six drums were properly labeled and stored on site. Three drums containing soil, two drums containing groundwater from well development and purging/sampling and decontamination water, and one drum containing soiled PPE was accumulated during the soil and groundwater investigation and are currently staged on site.

4.0 OBSERVATIONS AND ANALYTICAL FINDINGS

4.1 Nature of On-Site Materials

TRC completed 13 soil borings to characterize subsurface conditions adjacent to historic UST locations at the Site. Soil borings exposed urban fill materials to depths of approximately 5- to 10-feet below grade (ftbg). The urban fill appears to consist mainly of brown fine to coarse sand with some gravel and silt and contains construction debris including brick and concrete. Native glacial deposits below the urban fill consist of brown fine to coarse sand with some fine gravel and cobbles. Shallow refusal was encountered at several locations and was believed to be caused by large cobles or boulders. Boring logs describing subsurface conditions at the Site are presented in Appendix C.

4.2 Geophysical Survey

On July 16, 2007, a geophysical survey was performed by Enviroprobe for the purpose of locating underground storage tanks (USTs) and clearing proposed boring locations of buried utilities. The GPR penetration depth varied throughout the survey area and ranged from approximately 2 to 5 ftbg. Due to the presence of reinforced concrete, the GPR range was limited and could not confirm whether or not USTs were present at the two locations near the Maintenance Building. For each proposed boring location, an area measuring approximately 10 feet by 10 feet around the borings, were surveyed for underground utility pipes using Radiodetection instruments, metal detector and GPR. Located buried utilities were marked on the ground surface with spray paint to aid in locating borings away from these utilities.

4.3 Soil Boring/UST Investigation

TRC completed 13 soil borings and collected 14 soil samples from these borings for laboratory analysis to assess the soil conditions near the historic UST locations. The soil boring sample analytical results are summarized in Tables 1 through 5. Laboratory sample data summary reports are presented in Appendix D. Figure 3 shows the soil sampling boring locations. Soil contaminant levels were evaluated by comparison with the NYSDEC's 6 NYCRR Part 375 Brownfield Cleanup Program (BCP) Unrestricted Residential Use and Restricted Residential Use Soil Cleanup Objectives (SCOs). The SCO values used for comparison are the lower of the Protection of Public Health SCO or Protection of Groundwater SCO. These SCOs are the most recent published risk- and use-based levels that became effective December 14, 2006. Additionally, soil contaminant levels were compared to NYSDEC's Technical and Administrative Guidance Memorandum 4046 (TAGM 4046) recommended soil cleanup objectives (RSCOs) for inactive hazardous waste sites. The TAGM 4046 soil guidelines are still used by the NYSDEC to assess soil levels at sites outside of the BCP, Environmental Restoration Program, or

inactive hazardous waste disposal site remedial program. Therefore, comparison to the TAGM 4046 criteria is included because some NYSDEC Departments and the New York City Department of Environmental Protection (NYCDEP) continue to use these guidelines to evaluate sites in NYC. Significant findings of the soil boring sample analyses are summarized below:

- Slightly elevated PID readings and petroleum-like odors were observed in the field at boring locations SB-8 and SB-12.
- No VOCs were detected in the soil samples at concentrations exceeding NYSDEC Unrestricted or Restricted Residential Use SCOs or TAGM 4046 RSCOs. The 1,2-Dichloroethane presence in several of the soil samples was due to laboratory contamination. The laboratory has provided documentation confirming that the analysis for this compound is artificially elevated.
- SVOCs were detected at concentrations exceeding NYSDEC Unrestricted and Restricted Residential Use SCOs and TAGM 4046 RSCOs in 3 samples (SB-1 (13-15), SB-3 (12-14) and SB-7 (18-20)) of the 14 soil boring samples. The reporting limits for some SVOCs reported as undetected are slightly above the respective SCO; however, TRC was informed by the laboratory that the reporting limits are the lowest that could be achieved by the analytical method. The SVOCs detected above the comparison criteria consist primarily of carcinogenic polycyclic aromatic hydrocarbons (PAHs). While PAHs are associated with petroleum contamination, they are also commonly detected in urban fill due to fill characteristics and site conditions (e.g., asphalt fragments, urban atmospheric deposition). The highest concentrations of total SVOCs were detected at sample locations SB-1 (13-15). This soil sample was characterized as brown sand, clay and gravel with no PID readings, staining or odors. Soil sample SB-8 (18-20) and SB-12 (11-12) that had the highest observed PID levels and signs of potential petroleum impacts had nondetectable SVOC levels with similar reporting limits.
- No pesticides or PCBs were detected in the soil samples at concentrations exceeding NYSDEC's Unrestricted or Restricted Residential Use SCOs or TAGM 4046 RSCOs. The reporting limits for some pesticide compounds reported as undetected are slightly above the respective SCO; however, TRC was informed by the laboratory that the reporting limits are the lowest that could be achieved by the analytical standard method.
- Metals were not detected at concentrations exceeding NYSDEC Restricted Residential Use SCOs in the 13 samples collected. Several metals, were detected in the soil boring samples at levels above Unrestricted Residential Use SCOs including mercury in five samples, lead in three of the samples, nickel in two samples, and copper and zinc in one sample. Sample SB-6 (15-17) had three metals exceeding Unrestricted Residential Use SCOs and this sample consisted of sand and weathered rock with no signs of potential contamination. Several metals were detected in

the soil boring samples at levels above TAGM NYS background levels including beryllium in all eighteen samples, chromium in all eighteen samples, copper in seven samples, iron in all eighteen samples, nickel in seventeen samples, and zinc in all eighteen samples. Soil sample SB-8 (18-20) that had the highest observed PID level and signs of potential petroleum impacts (staining, odor) had no metals detected above SCOs. Based on the absence of any signs or potential sources of metals contamination related to the Site, these findings are likely indicative of site-specific background metals soil levels related to the native soils and/or urban fill conditions.

4.4 Groundwater Quality

TRC collected groundwater samples at four groundwater monitoring wells installed near historic UST locations at the western end of the Site to assess the presence of any groundwater impacts related to the former known UST operations. The analytical results are summarized on Tables 6 through 9. Groundwater contaminant levels were evaluated by comparison with the State's Ambient Water Quality Standards and Guidance Values for Class GA groundwater, as presented in the Division of Water Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards and Guidance Values and Groundwater Effluent Limitations (TOGS 1.1.1). Class GA groundwater represents a source of Drinking Water, and represents the groundwater classification that the NYSDEC would likely assign to the Site. Laboratory summary reports for the groundwater samples are presented in Appendix D. Figure 3 shows the groundwater sample locations. Significant findings of the groundwater sample analyses for this Phase II ESA are summarized below.

- One VOC was detected in the groundwater samples and it was detected a concentration just above the respective Class GA drinking water standard. Hexachlorobutadiene was detected at 0.63ug/L, slightly exceeding the Class GA standard of 0.5 ug/L. According to the federal Agency for Toxic Substances and Disease Registry (ATSDR) toxicological profile for this substance, Hexachlorobutadiene does not occur naturally in the environment. It is formed during the processing of other chemicals such as tetrachloroethylene, trichloroethylene, and carbon tetrachloride. Hexachlorobutadiene is an intermediate in the manufacture of rubber compounds and lubricants. It is used as a fluid for gyroscopes, a heat transfer liquid, or a hydraulic fluid. Therefore, TRC does not believe that this finding is related to the former historic UST operations on the Site.
- No SVOCs were detected in the groundwater samples.
- Several metals were detected at concentrations exceeding Class GA standards in each groundwater sample including iron, magnesium, manganese and sodium. Both the total and

dissolved (filtered) metals levels exceeded these standards. All of these metals are naturally occurring metals that are likely related to background soil and bedrock conditions in the area. Other metals detected in at least one of the groundwater samples but at levels below Class GA standards include calcium, copper, and chromium. Calcium was detected in each sample; however, there is no NYS groundwater standard or guidance value for calcium. Copper and chromium were only detected in sample MW-1 located just upgradient of the former gasoline UST along the western side of the Armory building.

- There were no signs of potential petroleum impacts (e.g., sheen, odor, free product) in the groundwater during the development, purging, or sampling of the wells.

4.5 Surficial Soil Quality/Shooting Ranges

TRC collected 18 soil samples from fifteen (15) surficial soil sampling locations for laboratory analysis to characterize total lead conditions at the indoor shooting ranges on the Site. One surficial soil sample was collected from within the 0 to 6 inches below grade at each location, In addition, at three of the locations, collocated samples were collected from multiple depths including TRC-SB-J/10 (0-3") and TRC-SB-O/16 (6"-1'), TRC-SB-K/11 and TRC-SB-Q/17 (screened through sieve), and TRC-SB-E/5 and TRC-SB-R/18 (screened through sieve). All of these samples were analyzed for total lead to assess the lead levels in the soils related to the prior shooting range operations. Of the 18 samples collected, 11 surficial soil samples were also analyzed for TCLP lead to assess leachable lead levels in representative samples from these areas. The surficial soil sample analytical results are summarized in Tables 6 and 7. Laboratory sample data summary reports are presented in Appendix D. Figure 5 shows the indoor shooting range soil sample locations. Soil contaminant levels were evaluated by comparison with the NYSDEC's 6 NYCRR Part 375 Unrestricted Residential Use and Restricted Residential Use Soil Cleanup Objectives SCOs and NYSDEC's TAGM 4046 RSCOs. Significant findings of the soil sample analyses are summarized below:

- The total lead levels of all but one of the soil samples (SB-O/15(0-3")) from the shooting ranges exceed the Unrestricted Residential Use SCO for lead (63 ppm). Of the remaining 17 soil samples, 12 samples had total lead levels that exceeded the Restricted Residential Use SCO (400 ppm) and the TAGM typical urban background upper range (500 ppm). Samples SB-K/11 and SB-E/5 were screened through a sieve in the field to remove large pieces of lead shot from the samples to produce samples SB-Q/17 and SB-R/18, respectively. The total lead concentrations between the sieved and non-sieved samples revealed little to no differences in concentrations. However, the shallow and deep analysis total lead comparison in samples TRC-SB-J/10 (0-3") (2,400 mg/kg) and TRC-SB-P/16 (6"-1') (180 mg/kg) from the same location showed significant differences in total lead concentrations. Also, there was a significant difference in concentration levels with regards to the distance of the sample location from the metal backstop or soil berm.

Generally, the samples collected closer to the metal backstop or soil berm backstop contained a higher concentration of total lead. The exceptions to this finding are samples SB-G/7 (3,200 mg/kg, collected from soil berm backstop) and SB-H/8 (5,500 mg/kg, collected from midway between firing area and berm), which were collected from the same shooting range. This finding may be due to the presence of more lead shot being present in the H/8 sample than the G/7 sample and not necessarily representative of the overall conditions in that range.

- TCLP lead was detected in 10 of the 11 soil samples submitted for this analysis. Representative samples were selected for TCLP testing based on the total lead sample results and consideration of various sample locations and depths in the shooting ranges. Leachable lead concentrations ranged from 1.6 mg/kg in TRC-SB-L/12 (3"-6") to 1,900 mg/kg in TRC-SB-A/1 (3-6"). Eight of these samples had TCLP lead levels that exceed the hazardous waste criterion for characterizing waste. The sieve screened samples TRC-SB-Q/17 and TRC-SB-R/18 showed a minor decrease in leachable concentrations from sieving samples SB-K/11 and SB-E/5. Whereas, a comparison of the leachable lead levels in the shallow and deep samples from the same location, TRC-SB-J/10 (0-3") (100 mg/L) and TRC-SB-P/16 (6"-1') (4.2 mg/L), showed significant differences in leachable lead concentrations.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Three inactive suspect petroleum ASTs are present in the building. One inactive AST located on the drill floor still contains diesel fuel and must be emptied and removed. Two other former ASTs on the subbasement level appeared to be empty; however, they were not completely accessible due to surrounding debris and could not be opened. These tanks must be emptied of any remaining or residual contents and removed. The drums that remain on the site are empty and should be collected and disposed of off site. Any other abandoned containers of unused products (e.g., paints, roofing cement) should also be collected and appropriately disposed of off site.

The test pit investigation confirmed the presence of two former petroleum USTs at the Site that had been closed in place by filling with gravel/sand mixture. The two tanks are located below two concrete covered areas in the parking lot directly west of the Maintenance Building. These are likely the two on-site USTs (3,000 gallon diesel, and 2,000 gallon gasoline) noted in the Phase I ESA report that were closed in September 1993. At another former gasoline UST location west of the Armory building, the survey did not detect a remaining UST; however, an existing guard booth over the suspected former UST location made it impossible to survey the actual suspected former UST location. Although a previous geophysical survey at the same location prior to the construction of the guard booth indicated no remaining UST. The Phase I ESA provides a record indicating that one 225-gallon gasoline UST was closed-removed in 1995 at the Site. This may have been the gasoline tank that was at this location but there is insufficient documentation to confirm if this was the same tank. The Phase I ESA also includes records regarding several spill reports associated with leaking tanks at the Site. The spill reports indicate the removal of tanks and soil contamination; however, there is insufficient information to determine the exact locations of the historic tanks and spills. NYSDEC records or other records sources (e.g., National Guard, Phase I ESA FOIL responses) should be researched further for any additional documentation on the tank closures and associated spills at the Site.

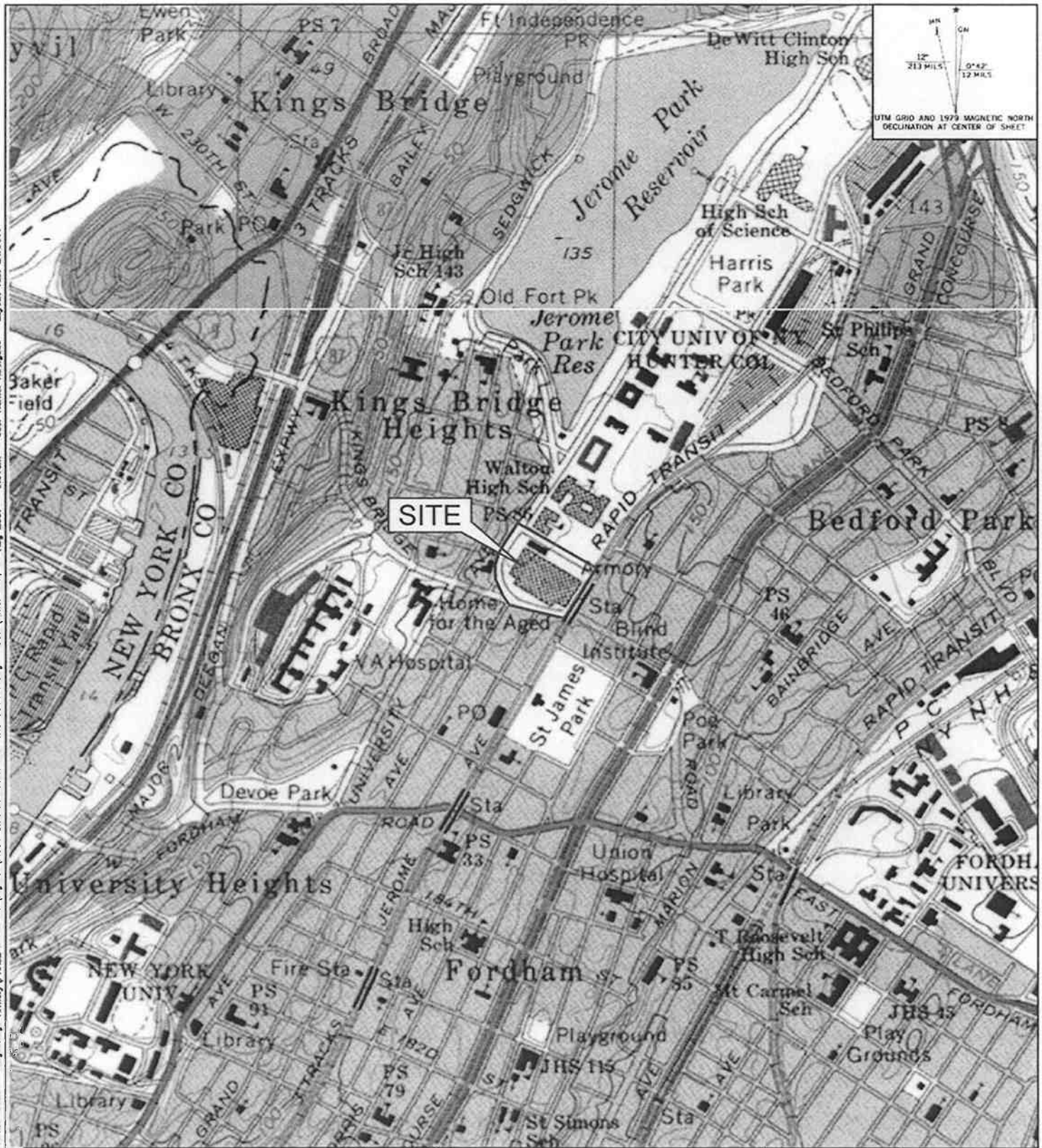
The results of the soil boring investigation around the former petroleum UST location indicate no significant concentrations of VOCs, SVOCs, PCBs, pesticides, or metals in the soils associated with the tanks. Rather, the investigation generally revealed the presence of soils with no signs of petroleum impacts with low levels of SVOCs and metals typically associated with such urban soils. Signs of petroleum impacts (e.g., odors, staining, PID readings) were observed at depths above the groundwater table at two boring locations (SB-8 at 18-20 ftbg, SB-12 at 11-12 ftbg). However, no SVOCs were

detected in either sample and only low levels of VOCs below established soil cleanup objective were detected in soil sample SB-8.

The results of the groundwater sample analysis indicate no detectable concentrations of SVOCs, pesticides, or PCBs in the groundwater near the former petroleum USTs. A low level of one VOC, hexachlorobutadiene, was detected in one well sample (MW-2) and at a concentration (0.63 ppb) slightly above the respective GA drinking water standard (0.5 ppb). The source of this VOC is unknown; however, it is not believed to be related to the former petroleum USTs on the Site. In addition, there were no signs of potential petroleum impacts (e.g., sheen, odor, free product) in the groundwater during the development, purging, or sampling of the wells. Other than calcium, iron, magnesium, manganese, and sodium, which typically reflect regional groundwater quality, no elevated concentrations of metals were detected in the groundwater. Based on the soil boring and groundwater findings, TRC does not recommend any further soil or groundwater investigations at the former UST locations unless such additional information is required by NYSDEC to close out open spill reports associated with the UST closures.

The indoor shooting range soil testing indicates the presence of elevated concentrations of total and TCLP leachable lead in the soils in the range. The highest lead levels were generally detected in the near surface soils and in the soil mounds located at the ends of several of the ranges. Lower lead levels were also generally detected in soils near the front of the ranges away from the ends where the bullets deflected into the soil floor. A majority of the samples tested for leachable lead levels showed lead levels that exceed hazardous waste characteristic criteria. TRC also observed evidence that there are large amounts of gunshot imbedded in the deteriorated wooden timber wall of the one western-most pistol range. Based on these findings, these soils and wooden timber wall should be removed and properly disposed off site with much of these soils having to be appropriately managed/disposed of as hazardous waste. The physical separation of lead shot from the soils during any removal will likely aid in reducing the soil lead levels, however, the limited screening done under this assessment showed no appreciable reduction.

FIGURES



SCALE 1:24 000

1 0.5 0 KILOMETERS 1 2

1000 0 METERS 1000 2000

1 0.5 0 1

MILES

1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000

FEET



QUADRANGLE LOCATION

CENTRAL PARK, N.Y. – N.J.
40073-G8-TF-024
1966

YONKERS, NY-NJ
1998

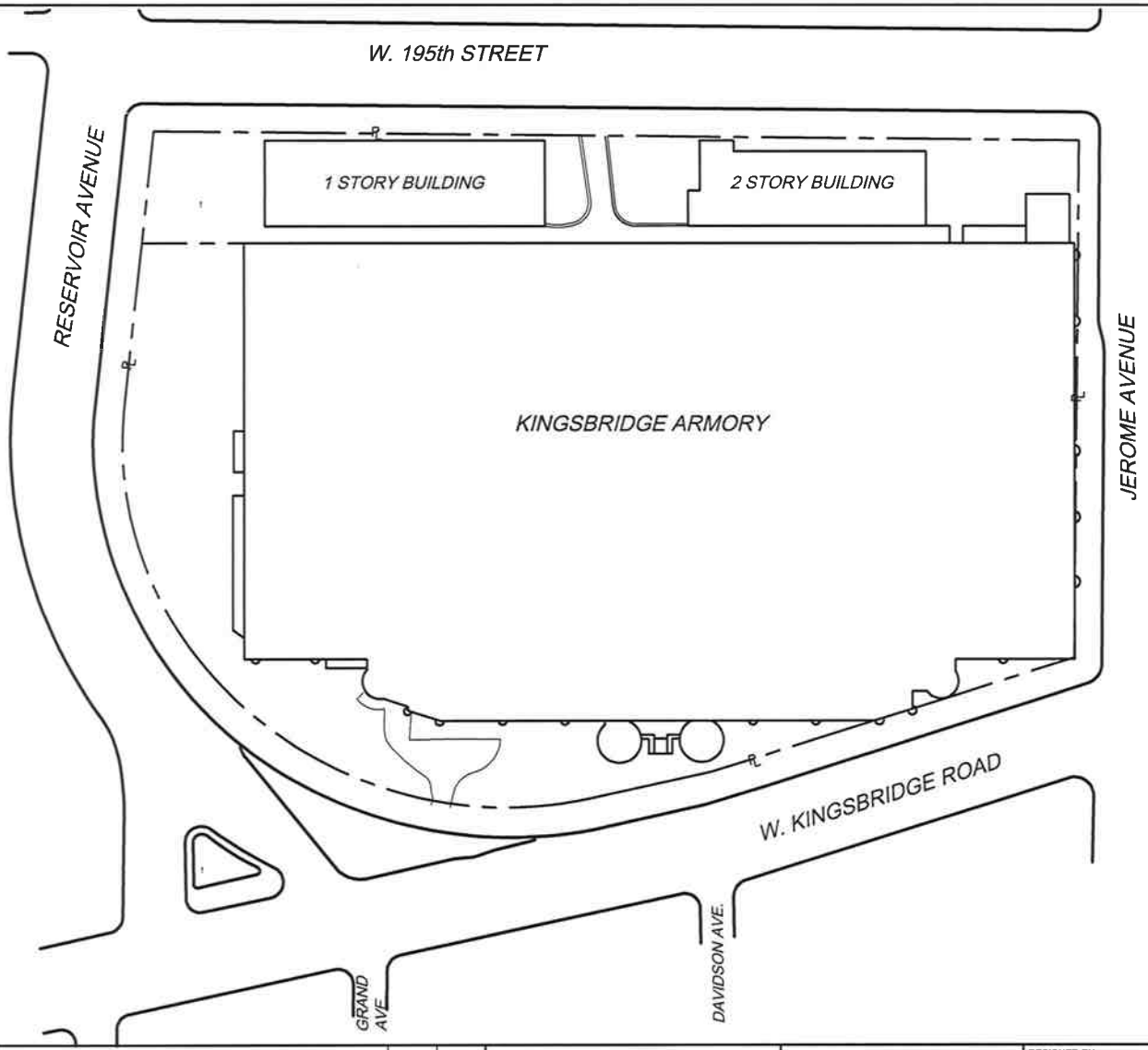
MAP OBTAINED THROUGH USE OF MAPTECH TERRAIN NAVIGATOR PRO SOFTWARE

TRC
1430 BROADWAY, 10TH FLOOR
NEW YORK, NEW YORK 10018
212-221-7822

DESIGNED BY: HD	PROJECT NAME: KINGSBRIDGE ARMORY BRONX, NEW YORK
DRAWN BY: HD	
CHECKED BY: SM	
DATE: AUGUST 2007	DRAWING TITLE: SITE LOCATION MAP
SCALE: AS SHOWN	
PROJECT NUMBER: 113429.0120.0000	

FIGURE 1

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LEGEND

PROPERTY LINE

SOURCE:
MAP TITLED "KINGSBRIDGE ARMORY, BLOCK 3247, LOTS 2 & 10, BRONX COUNTY, NEW YORK, BOUNDARY & UTILITY SURVEY", SHEET 1 OF 1, DATED; 5/29/07, BY MERCATOR LAND SURVEYING, LLC.

REVISIONS NO.	DESCRIPTION	BY	DATE

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GRAPHIC SCALE
PAPER SIZE: 11" x 17"

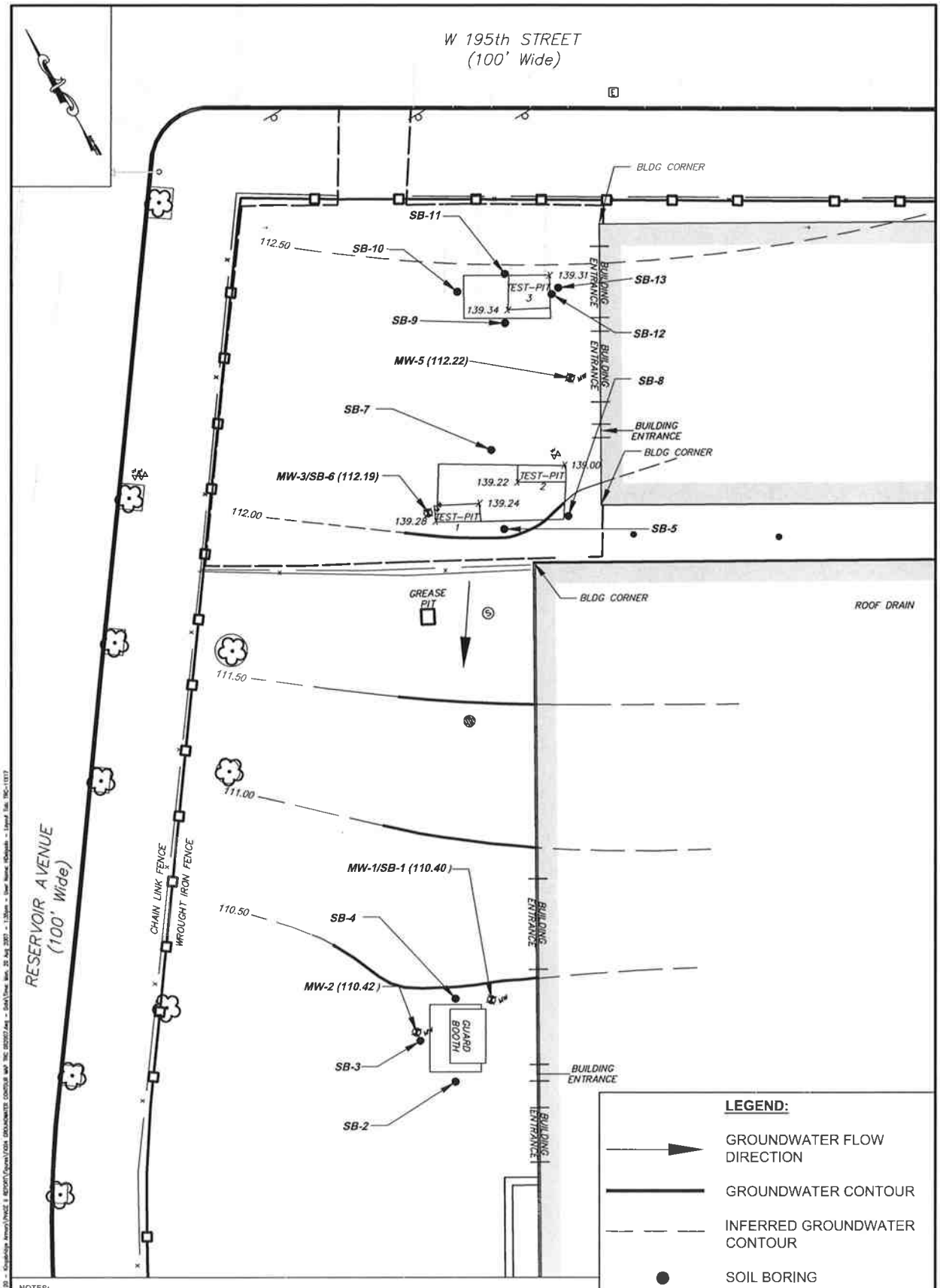
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DATE: AUGUST 2007	
SCALE: AS SHOWN	
PROJECT NUMBER: 113429.0120.0000	

PROJECT NAME:
KINGSBRIDGE ARMORY
BRONX , NEW YORK

DRAWING TITLE:
SITE LAYOUT

FIGURE
2



NOTES:

1. THIS DRAWING IS BASED UPON A COMBINATION OF AERIAL MAPS, FEILD INVESTIGATIONS AND SURVEYS CONDUCTED BY MERCATOR LAND SURVEYING, LLC ENDING ON APRIL 2007 BY AND/OR UNDER THE DIRECT SUPERVISION OF THE UNDERSIGNED SUVEYOR.
2. THE VERTICAL DATUM BASIS IS BOROUGH OF THE BRONX HIGHWAY DATUM WHICH IS 2.608' ABOVE SEA LEVEL AT SANDY HOOK, NEW JERSEY (NGVD29).

0 20 40 FT.

GRAPHIC SCALE: 1"=20'

PAPER SIZE: 17" x 11"

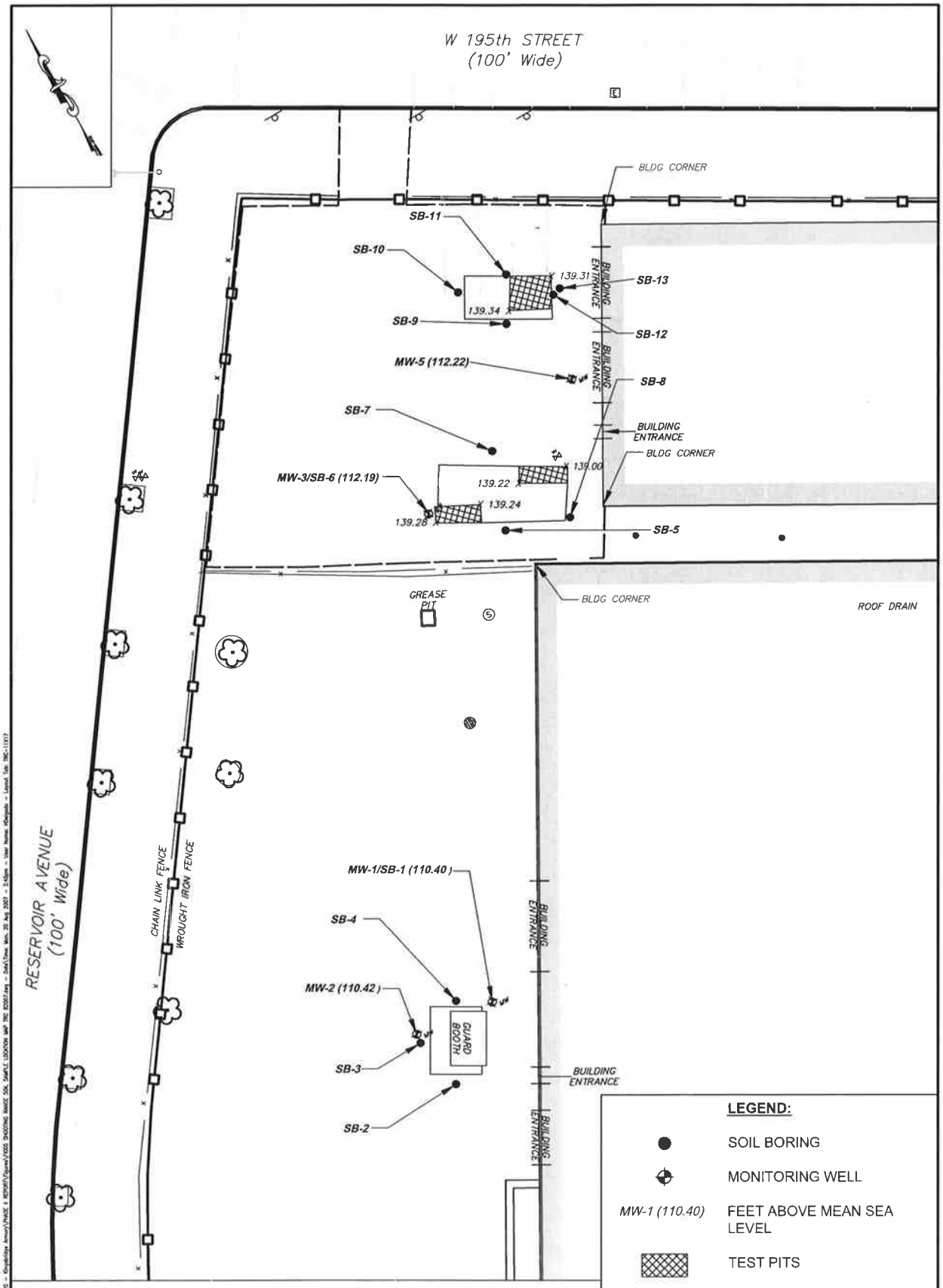
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DATE: AUGUST 2007	
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PROJECT NUMBER: 113429.0120.0000	

PROJECT NAME: **KINGSBRIDGE ARMORY BRONX, NEW YORK**

DRAWING TITLE: GROUNDWATER CONTOUR MAP AUGUST 6, 2007

FIGURE 4



NOTES:

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2. THE VERTICAL DATUM BASIS IS BOROUGH OF THE BRONX HIGHWAY DATUM WHICH IS 2.608' ABOVE SEA LEVEL AT SANDY HOOK, NEW JERSEY (NGVD29).

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GRAPHIC SCALE: 1"=20'

PAPER SIZE: 17" x 11"

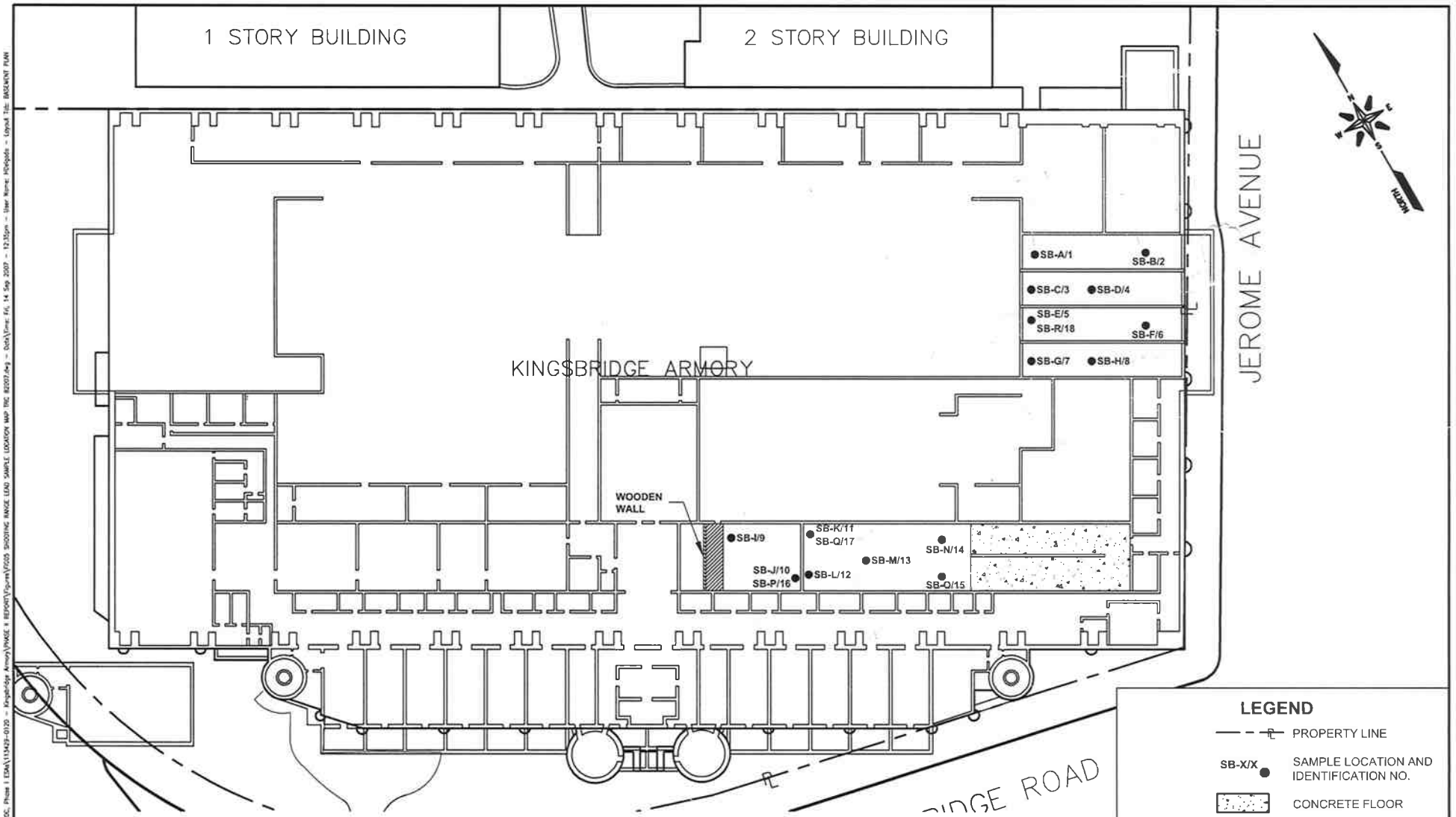
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DATE: AUGUST 2007	
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PROJECT NUMBER: 113429.0120.0000	

PROJECT NAME: **KINGSBRIDGE ARMORY**
BRONX, NEW YORK

DRAWING TITLE: SOIL AND GROUNDWATER SAMPLE LOCATION MAP

FIGURE 3



REVISIONS

NO.	DESCRIPTION	BY	DATE

0 50' 100'

GRAPHIC SCALE

PAPER SIZE: 11" x 17"

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DATE:	AUGUST 2007
SCALE:	AS SHOWN
PROJECT NUMBER:	113429.0120.0000

PROJECT NAME:
KINGSBRIDGE ARMORY
BRONX , NEW YORK

DRAWING TITLE:
SHOOTING RANGE SOIL SAMPLE LOCATION MAP

FIGURE
5

Plot/Name: \\Projects\113429 - NYCEDC, Phase I ESAs\113429-0120 - Kingsbridge Armory\PHASE II REPORT\Figure\FIG05 SHOOTING RANGE LEAD SAMPLE LOCATION MAP TRC 82007.dwg - Data\Date: Fri, 14 Sep 2007 - 12:35pm - User Name: HDelpido - Layout Title: BASEMENT PLAN

TABLES

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-1 (13-15) 7/19/2007 L0710362-01 mg/kg	Qual	TRC-SB-2 (13-15) 7/19/2007 L0710362-02 mg/kg	Qual	TRC-SB-3 (12-14) 7/19/2007 L0710362-03 mg/kg	Qual	TRC-SB-4 (7-9) 7/19/2007 L0710362-04 mg/kg	Qual
Volatile Organics by EPA 8260B											
1,1,1,2-Tetrachloroethane	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
1,1,1-Trichloroethane	0.8	100	0.68	0.0029	U	0.0029	U	0.0029	U	0.0028	U
1,1,2,2-Tetrachloroethane	0.6	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	6	NC	NC	0.057	U	0.058	U	0.057	U	0.056	U
1,1,2-Trichloroethane	NC	NC	NC	0.0043	U	0.0044	U	0.0043	U	0.0042	U
1,1-Dichloroethane	0.2	19	0.27	0.0043	U	0.0044	U	0.0043	U	0.0042	U
1,1-Dichloroethene	0.4	100	0.33	0.0029	U	0.0029	U	0.0029	U	0.0028	U
1,1-Dichloropropene	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
1,2,3-Trichlorobenzene	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
1,2,4,5-Tetramethylbenzene	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
1,2,4-Trichlorobenzene	3.4	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
1,2,4-Trimethylbenzene	10	47	3.6	0.014	U	0.014	U	0.014	U	0.014	U
1,2-Dibromo-3-chloropropane	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
1,2-Dibromoethane	NC	NC	NC	0.011	U	0.012	U	0.011	U	0.011	U
1,2-Dichlorobenzene	7.9	100	1.1	0.014	U	0.014	U	0.014	U	0.014	U
1,2-Dichloroethane	0.1	2.3	0.02	0.014		**0.022**		**0.038**		0.03	
1,2-Dichloropropane	NC	NC	NC	0.01	U	0.01	U	0.01	U	0.0097	U
1,3,5-Trimethylbenzene	3.3	47	8.4	0.014	U	0.014	U	0.014	U	0.014	U
1,3-Dichlorobenzene	1.6	17	2.4	0.014	U	0.014	U	0.014	U	0.014	U
1,3-Dichloropropane	0.3	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
1,4-Dichlorobenzene	8.5	9.8	1.8	0.014	U	0.014	U	0.014	U	0.014	U
1,4-Diethylbenzene	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
2,2-Dichloropropane	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
2-Butanone	0.3	100	0.12	0.029	U	0.029	U	0.029	U	0.028	U
2-Hexanone	NC	NC	NC	0.029	U	0.029	U	0.029	U	0.028	U
4-Ethyltoluene	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
4-Methyl-2-pentanone	1	NC	NC	0.029	U	0.029	U	0.029	U	0.028	U
Acetone	0.2	100	0.05	0.029	U	0.029	U	0.029	U	0.028	U

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandums
Represents restricted residential use prohibits use of single family housing and vegetable gardens. Includes active recreational uses, which are public uses with a reasonable potential for soil contact. Restrictions on the use of groundwater are allowed
U - Concentration less than the minimum laboratory detection limit
NC - No guidance criteria estabilsed for this compound
Bold values exceed unrestricted residential use
Shaded values exceed restricted residential use

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION	TAGM 4046	Restricted Residential Use	Unrestricted Residential Use	TRC-SB-1 (13-15)		TRC-SB-2 (13-15)		TRC-SB-3 (12-14)		TRC-SB-4 (7-9)	
SAMPLING DATE	Rec. Soil	Soil Cleanup	Soil Cleanup	7/19/2007		7/19/2007		7/19/2007		7/19/2007	
LAB SAMPLE ID	Cleanup Obj.	Objectives	Objectives	L0710362-01		L0710362-02		L0710362-03		L0710362-04	
UNITS	mg/kg	mg/kg	mg/kg	mg/kg	Qual	mg/kg	Qual	mg/kg	Qual	mg/kg	Qual
Benzene	0.06	2.9	0.06	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Bromobenzene	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
Bromochloromethane	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
Bromodichloromethane	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Bromoform	NC	NC	NC	0.011	U	0.012	U	0.011	U	0.011	U
Bromomethane	NC	NC	NC	0.0057	U	0.0058	U	0.0057	U	0.0056	U
Carbon disulfide	2.7	NC	NC	0.029	U	0.029	U	0.029	U	0.028	U
Carbon tetrachloride	0.6	1.4	0.76	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Chlorobenzene	1.7	100	1.1	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Chloroethane	1.9	NC	NC	0.0057	U	0.0058	U	0.0057	U	0.0056	U
Chloroform	0.3	10	0.37	0.0043	U	0.0044	U	0.0043	U	0.0042	U
Chloromethane	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
cis-1,2-Dichloroethene	NC	59	0.25	0.0029	U	0.0029	U	0.0029	U	0.0028	U
cis-1,3-Dichloropropene	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Dibromochloromethane	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Dibromomethane	NC	NC	NC	0.029	U	0.029	U	0.029	U	0.028	U
Dichlorodifluoromethane	NC	NC	NC	0.029	U	0.029	U	0.029	U	0.028	U
Ethylbenzene	5.5	30	1	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Hexachlorobutadiene	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
Isopropylbenzene	2.3	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Methyl tert butyl ether	0.12	62	0.93	0.0057	U	0.0058	U	0.0057	U	0.0056	U
Methylene chloride	0.1	51	0.05	0.029	U	0.029	U	0.029	U	0.028	U
n-Butylbenzene	10	100	12	0.0029	U	0.0029	U	0.0029	U	0.0028	U
n-Propylbenzene	3.7	100	3.9	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Naphthalene	13	100	12	0.014	U	0.014	U	0.014	U	0.014	U
o-Chlorotoluene	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
o-Xylene	NC	NC	NC	0.0057	U	0.0058	U	0.0057	U	0.0056	U
p-Chlorotoluene	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
p-Isopropyltoluene	10	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
p/m-Xylene	NC	NC	NC	0.0057	U	0.0058	U	0.0057	U	0.0056	U
sec-Butylbenzene	10	100	11	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Styrene	NC	NC	NC	0.0057	U	0.0058	U	0.0057	U	0.0056	U
tert-Butylbenzene	10	100	5.9	0.014	U	0.014	U	0.014	U	0.014	U
Tetrachloroethene	1.4	5.5	1.3	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Toluene	1.5	100	0.7	0.0043	U	0.0044	U	0.0043	U	0.0042	U
trans-1,2-Dichloroethene	0.3	100	0.19	0.0043	U	0.0044	U	0.0043	U	0.0042	U
trans-1,3-Dichloropropene	NC	NC	NC	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Trichloroethene	0.7	10	0.47	0.0029	U	0.0029	U	0.0029	U	0.0028	U
Trichlorofluoromethane	NC	NC	NC	0.014	U	0.014	U	0.014	U	0.014	U
Vinyl acetate	NC	NC	NC	0.029	U	0.029	U	0.029	U	0.028	U
Vinyl chloride	0.2	0.21	0.02	0.0057	U	0.0058	U	0.0057	U	0.0056	U

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NC - No guidance criteria established for this compound

Bold values exceed unrestricted residential use.

Shaded values exceed restricted residential use.

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-5 (23-25) 7/19/2007 L0710362-05 mg/kg	Qual	TRC-SB-6 (35-17) 7/19/2007 L0710362-06 mg/kg	Qual	TRC-SB-7 (18-20) 7/19/2007 L0710362-07 mg/kg	Qual	TRC-SB-8 (18-20) 7/19/2007 L0710362-08 mg/kg	Qual
Volatile Organics by EPA 8260B											
1,1,1,2-Tetrachloroethane	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
1,1,1-Trichloroethane	0.8	100	0.68	0.0029	U	0.0028	U	0.0027	U	0.0029	U
1,1,2,2-Tetrachloroethane	0.6	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	6	NC	NC	0.059	U	0.056	U	0.055	U	0.059	U
1,1,2-Trichloroethane	NC	NC	NC	0.0044	U	0.0042	U	0.0041	U	0.0044	U
1,1-Dichloroethane	0.2	19	0.27	0.0044	U	0.0042	U	0.0041	U	0.0044	U
1,1-Dichloroethene	0.4	100	0.33	0.0029	U	0.0028	U	0.0027	U	0.0029	U
1,1-Dichloropropene	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
1,2,3-Trichlorobenzene	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
1,2,4,5-Tetramethylbenzene	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.032	
1,2,4-Trichlorobenzene	3.4	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
1,2,4-Trimethylbenzene	10	47	3.6	0.015	U	0.014	U	0.014	U	0.015	U
1,2-Dibromo-3-chloropropane	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
1,2-Dibromoethane	NC	NC	NC	0.012	U	0.011	U	0.011	U	0.012	U
1,2-Dichlorobenzene	7.9	100	1.1	0.015	U	0.014	U	0.014	U	0.015	U
1,2-Dichloroethane	0.1	2.3	0.02	0.039		0.017		0.023		0.01	
1,2-Dichloropropane	NC	NC	NC	0.01	U	0.0097	U	0.0096	U	0.01	U
1,3,5-Trimethylbenzene	3.3	47	8.4	0.015	U	0.014	U	0.014	U	0.015	U
1,3-Dichlorobenzene	1.6	17	2.4	0.015	U	0.014	U	0.014	U	0.015	U
1,3-Dichloropropane	0.3	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
1,4-Dichlorobenzene	8.5	9.8	1.8	0.015	U	0.014	U	0.014	U	0.015	U
1,4-Diethylbenzene	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0042	
2,2-Dichloropropane	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
2-Butanone	0.3	100	0.12	0.029	U	0.028	U	0.027	U	0.029	U
2-Hexanone	NC	NC	NC	0.029	U	0.028	U	0.027	U	0.029	U
4-Ethyltoluene	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
4-Methyl-2-pentanone	1	NC	NC	0.029	U	0.028	U	0.027	U	0.029	U
Acetone	0.2	100	0.05	0.029	U	0.028	U	0.027	U	0.038	

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U - Concentration less than the minimum laboratory detection limit
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Bold values exceed unrestricted residential use.
Shaded values exceed restricted residential use.

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-5 (23-25) 7/19/2007 L0710362-05 mg/kg	Qual	TRC-SB-6 (15-17) 7/19/2007 L0710362-06 mg/kg	Qual	TRC-SB-7 (18-20) 7/19/2007 L0710362-07 mg/kg	Qual	TRC-SB-8 (18-20) 7/19/2007 L0710362-08 mg/kg	Qual
Benzene	0.06	2.9	0.06	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Bromobenzene	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
Bromochloromethane	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
Bromodichloromethane	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Bromoform	NC	NC	NC	0.012	U	0.011	U	0.011	U	0.012	U
Bromomethane	NC	NC	NC	0.0059	U	0.0056	U	0.0055	U	0.0059	U
Carbon disulfide	2.7	NC	NC	0.029	U	0.028	U	0.027	U	0.029	U
Carbon tetrachloride	0.6	1.4	0.76	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Chlorobenzene	1.7	100	1.1	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Chloroethane	1.9	NC	NC	0.0059	U	0.0056	U	0.0055	U	0.0059	U
Chloroform	0.3	10	0.37	0.0044	U	0.0042	U	0.0041	U	0.0044	U
Chloromethane	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
cis-1,2-Dichloroethene	NC	59	0.25	0.0029	U	0.0028	U	0.0027	U	0.0029	U
cis-1,3-Dichloropropene	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Dibromochloromethane	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Dibromomethane	NC	NC	NC	0.029	U	0.028	U	0.027	U	0.029	U
Dichlorodifluoromethane	NC	NC	NC	0.029	U	0.028	U	0.027	U	0.029	U
Ethylbenzene	5.5	30	1	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Hexachlorobutadiene	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
Isopropylbenzene	2.3	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Methyl tert butyl ether	0.12	62	0.93	0.0059	U	0.0056	U	0.0055	U	0.0059	U
Methylene chloride	0.1	51	0.05	0.029	U	0.028	U	0.027	U	0.029	U
n-Butylbenzene	10	100	12	0.0029	U	0.0028	U	0.0027	U	0.0029	U
n-Propylbenzene	3.7	100	3.9	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Naphthalene	13	100	12	0.015	U	0.014	U	0.014	U	0.015	U
o-Chlorotoluene	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
o-Xylene	NC	NC	NC	0.0059	U	0.0056	U	0.0055	U	0.0059	U
p-Chlorotoluene	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
p-Isopropyltoluene	10	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
p/m-Xylene	NC	NC	NC	0.0059	U	0.0056	U	0.0055	U	0.0059	U
sec-Butylbenzene	10	100	11	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Styrene	NC	NC	NC	0.0059	U	0.0056	U	0.0055	U	0.0059	U
tert-Butylbenzene	10	100	5.9	0.015	U	0.014	U	0.014	U	0.015	U
Tetrachloroethene	1.4	5.5	1.3	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Toluene	1.5	100	0.7	0.0044	U	0.0042	U	0.0041	U	0.0044	U
trans-1,2-Dichloroethene	0.3	100	0.19	0.0044	U	0.0042	U	0.0041	U	0.0044	U
trans-1,3-Dichloropropene	NC	NC	NC	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Trichloroethene	0.7	10	0.47	0.0029	U	0.0028	U	0.0027	U	0.0029	U
Trichlorofluoromethane	NC	NC	NC	0.015	U	0.014	U	0.014	U	0.015	U
Vinyl acetate	NC	NC	NC	0.029	U	0.028	U	0.027	U	0.029	U
Vinyl chloride	0.2	0.21	0.02	0.0059	U	0.0056	U	0.0055	U	0.0059	U

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Bold values exceed unrestricted residential use

Shaded values exceed restricted residential use.

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-8 (23-25) 7/19/2007 L0710362-09 mg/kg	Qual	TRC-SB-9 (24-26) 7/19/2007 L0710362-10 mg/kg	Qual	TRC-SB-10 (16-18) 7/19/2007 L0710362-11 mg/kg	Qual	TRC-SB-11 (10-12) 7/19/2007 L0710362-12 mg/kg	Qual
Volatile Organics by EPA 8260B											
1,1,1,2-Tetrachloroethane	NC	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
1,1,1-Trichloroethane	0.8	100	0.68	0.0029	U	0.0026	U	0.0027	U	0.0026	U
1,1,2,2-Tetrachloroethane	0.6	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	6	NC	NC	0.059	U	0.053	U	0.054	U	0.053	U
1,1,2-Trichloroethane	NC	NC	NC	0.0044	U	0.004	U	0.0041	U	0.004	U
1,1-Dichloroethane	0.2	19	0.27	0.0044	U	0.004	U	0.0041	U	0.004	U
1,1-Dichloroethene	0.4	100	0.33	0.0029	U	0.0026	U	0.0027	U	0.0026	U
1,1-Dichloropropene	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
1,2,3-Trichlorobenzene	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
1,2,4,5-Tetramethylbenzene	NC	NC	NC	0.0068		0.0026	U	0.0027	U	0.0026	U
1,2,4-Trichlorobenzene	3.4	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
1,2,4-Trimethylbenzene	10	47	3.6	0.015	U	0.013	U	0.014	U	0.013	U
1,2-Dibromo-3-chloropropane	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
1,2-Dibromoethane	NC	NC	NC	0.012	U	0.011	U	0.011	U	0.011	U
1,2-Dichlorobenzene	7.9	100	1.1	0.015	U	0.013	U	0.014	U	0.013	U
1,2-Dichloroethane	0.1	2.3	0.02	0.043		0.051		0.047		0.035	
1,2-Dichloropropane	NC	NC	NC	0.01	U	0.0093	U	0.0095	U	0.0093	U
1,3,5-Trimethylbenzene	3.3	47	8.4	0.015	U	0.013	U	0.014	U	0.013	U
1,3-Dichlorobenzene	1.6	17	2.4	0.015	U	0.013	U	0.014	U	0.013	U
1,3-Dichloropropane	0.3	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
1,4-Dichlorobenzene	8.5	9.8	1.8	0.015	U	0.013	U	0.014	U	0.013	U
1,4-Diethylbenzene	NC	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
2,2-Dichloropropane	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
2-Butanone	0.3	100	0.12	0.029	U	0.026	U	0.027	U	0.026	U
2-Hexanone	NC	NC	NC	0.029	U	0.026	U	0.027	U	0.026	U
4-Ethyltoluene	NC	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
4-Methyl-2-pentanone	1	NC	NC	0.029	U	0.026	U	0.027	U	0.026	U
Acetone	0.2	100	0.05	0.029	U	0.026	U	0.027	U	0.026	U

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Shaded values exceed restricted residential use

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-8 (23-25) 7/19/2007 L0710362-09 mg/kg	Qual	TRC-SB-9 (24-26) 7/19/2007 L0710362-10 mg/kg	Qual	TRC-SB-10 (16-18) 7/19/2007 L0710362-11 mg/kg	Qual	TRC-SB-11 (10-12) 7/19/2007 L0710362-12 mg/kg	Qual
Benzene	0.06	2.9	0.06	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Bromobenzene	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
Bromochloromethane	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
Bromodichloromethane	NC	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Bromoform	NC	NC	NC	0.012	U	0.011	U	0.011	U	0.011	U
Bromomethane	NC	NC	NC	0.0059	U	0.0053	U	0.0054	U	0.0053	U
Carbon disulfide	2.7	NC	NC	0.029	U	0.026	U	0.027	U	0.026	U
Carbon tetrachloride	0.6	1.4	0.76	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Chlorobenzene	1.7	100	1.1	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Chloroethane	1.9	NC	NC	0.0059	U	0.0053	U	0.0054	U	0.0053	U
Chloroform	0.3	10	0.37	0.0044	U	0.004	U	0.0041	U	0.004	U
Chloromethane	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
cis-1,2-Dichloroethene	NC	59	0.25	0.0029	U	0.0026	U	0.0027	U	0.0026	U
cis-1,3-Dichloropropene	NC	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Dibromochloromethane	NC	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Dibromomethane	NC	NC	NC	0.029	U	0.026	U	0.027	U	0.026	U
Dichlorodifluoromethane	NC	NC	NC	0.029	U	0.026	U	0.027	U	0.026	U
Ethylbenzene	5.5	30	1	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Hexachlorobutadiene	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
Isopropylbenzene	2.3	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Methyl tert butyl ether	0.12	62	0.93	0.0059	U	0.0053	U	0.0054	U	0.0053	U
Methylene chloride	0.1	51	0.05	0.029	U	0.026	U	0.027	U	0.026	U
n-Butylbenzene	10	100	12	0.0029	U	0.0026	U	0.0027	U	0.0026	U
n-Propylbenzene	3.7	100	3.9	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Naphthalene	13	100	12	0.015	U	0.013	U	0.014	U	0.013	U
o-Chlorotoluene	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
o-Xylene	NC	NC	NC	0.0059	U	0.0053	U	0.0054	U	0.0053	U
p-Chlorotoluene	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
p-Isopropyltoluene	10	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
p/m-Xylene	NC	NC	NC	0.0059	U	0.0053	U	0.0054	U	0.0053	U
sec-Butylbenzene	10	100	11	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Styrene	NC	NC	NC	0.0059	U	0.0053	U	0.0054	U	0.0053	U
tert-Butylbenzene	10	100	5.9	0.015	U	0.013	U	0.014	U	0.013	U
Tetrachloroethene	1.4	5.5	1.3	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Toluene	1.5	100	0.7	0.0044	U	0.004	U	0.0041	U	0.004	U
trans-1,2-Dichloroethene	0.3	100	0.19	0.0044	U	0.004	U	0.0041	U	0.004	U
trans-1,3-Dichloropropene	NC	NC	NC	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Trichloroethene	0.7	10	0.47	0.0029	U	0.0026	U	0.0027	U	0.0026	U
Trichlorofluoromethane	NC	NC	NC	0.015	U	0.013	U	0.014	U	0.013	U
Vinyl acetate	NC	NC	NC	0.029	U	0.026	U	0.027	U	0.026	U
Vinyl chloride	0.2	0.21	0.02	0.0059	U	0.0053	U	0.0054	U	0.0053	U

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Represents restricted residential use prohibits use of single family housing and vegetable gardens. Includes active recreational uses, which are public uses with a reasonable potential for soil contact. Restrictions on the use of groundwater are allowed

U - Concentration less than the minimum laboratory detection limit.

NC - No guidance criteria established for this compound

Bold values exceed unrestricted residential use.

Shaded values exceed restricted residential use

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-12 (11-12) 7/19/2007 L0710362-13 mg/kg	Qual	TRC-SB-13 (15-17) 7/19/2007 L0710362-15 mg/kg	Qual
Volatile Organics by EPA 8260B							
1,1,1,2-Tetrachloroethane	NC	NC	NC	0.0026	U	0.0027	U
1,1,1-Trichloroethane	0.8	100	0.68	0.0026	U	0.0027	U
1,1,2,2-Tetrachloroethane	0.6	NC	NC	0.0026	U	0.0027	U
1,1,2-Trichloro-1,2,2-Trifluoroethane	6	NC	NC	0.053	U	0.054	U
1,1,2-Trichloroethane	NC	NC	NC	0.004	U	0.0041	U
1,1-Dichloroethane	0.2	19	0.27	0.004	U	0.0041	U
1,1-Dichloroethene	0.4	100	0.33	0.0026	U	0.0027	U
1,1-Dichloropropene	NC	NC	NC	0.013	U	0.014	U
1,2,3-Trichlorobenzene	NC	NC	NC	0.013	U	0.014	U
1,2,4,5-Tetramethylbenzene	NC	NC	NC	0.0026	U	0.0027	U
1,2,4-Trichlorobenzene	3.4	NC	NC	0.013	U	0.014	U
1,2,4-Trimethylbenzene	10	47	3.6	0.013	U	0.014	U
1,2-Dibromo-3-chloropropane	NC	NC	NC	0.013	U	0.014	U
1,2-Dibromoethane	NC	NC	NC	0.011	U	0.011	U
1,2-Dichlorobenzene	7.9	100	1.1	0.013	U	0.014	U
1,2-Dichloroethane	0.1	2.3	0.02	0.082		0.0027	U
1,2-Dichloropropane	NC	NC	NC	0.0093	U	0.0095	U
1,3,5-Trimethylbenzene	3.3	47	8.4	0.013	U	0.014	U
1,3-Dichlorobenzene	1.6	17	2.4	0.013	U	0.014	U
1,3-Dichloropropane	0.3	NC	NC	0.013	U	0.014	U
1,4-Dichlorobenzene	8.5	9.8	1.8	0.013	U	0.014	U
1,4-Diethylbenzene	NC	NC	NC	0.0026	U	0.0027	U
2,2-Dichloropropane	NC	NC	NC	0.013	U	0.014	U
2-Butanone	0.3	100	0.12	0.026	U	0.027	U
2-Hexanone	NC	NC	NC	0.026	U	0.027	U
4-Ethyltoluene	NC	NC	NC	0.0026	U	0.0027	U
4-Methyl-2-pentanone	1	NC	NC	0.026	U	0.027	U
Acetone	0.2	100	0.05	0.026	U	0.027	U

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Bold values exceed unrestricted residential use.
Shaded values exceed restricted residential use.

Table 1
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - VOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-12 (11-12) 7/19/2007 L0710362-13 mg/kg	Qual	TRC-SB-13 (15-17) 7/19/2007 L0710362-15 mg/kg	Qual
Benzene	0.06	2.9	0.86	0.0026	U	0.0027	U
Bromobenzene	NC	NC	NC	0.013	U	0.014	U
Bromochloromethane	NC	NC	NC	0.013	U	0.014	U
Bromodichloromethane	NC	NC	NC	0.0026	U	0.0027	U
Bromoform	NC	NC	NC	0.011	U	0.011	U
Bromomethane	NC	NC	NC	0.0053	U	0.0054	U
Carbon disulfide	2.7	NC	NC	0.026	U	0.027	U
Carbon tetrachloride	0.6	1.4	0.76	0.0026	U	0.0027	U
Chlorobenzene	1.7	100	1.1	0.0026	U	0.0027	U
Chloroethane	1.9	NC	NC	0.0053	U	0.0054	U
Chloroform	0.3	10	0.37	0.004	U	0.0041	U
Chloromethane	NC	NC	NC	0.013	U	0.014	U
cis-1,2-Dichloroethene	NC	59	0.25	0.0026	U	0.0027	U
cis-1,3-Dichloropropene	NC	NC	NC	0.0026	U	0.0027	U
Dibromochloromethane	NC	NC	NC	0.0026	U	0.0027	U
Dibromomethane	NC	NC	NC	0.026	U	0.027	U
Dichlorodifluoromethane	NC	NC	NC	0.026	U	0.027	U
Ethylbenzene	5.5	30	1	0.0026	U	0.0027	U
Hexachlorobutadiene	NC	NC	NC	0.013	U	0.014	U
Isopropylbenzene	2.3	NC	NC	0.0026	U	0.0027	U
Methyl tert butyl ether	0.12	62	0.93	0.0053	U	0.0054	U
Methylene chloride	0.1	51	0.05	0.026	U	0.027	U
n-Butylbenzene	10	100	12	0.0026	U	0.0027	U
n-Propylbenzene	3.7	100	3.9	0.0026	U	0.0027	U
Naphthalene	13	100	12	0.013	U	0.014	U
o-Chlorotoluene	NC	NC	NC	0.013	U	0.014	U
o-Xylene	NC	NC	NC	0.0053	U	0.0054	U
p-Chlorotoluene	NC	NC	NC	0.013	U	0.014	U
p-Isopropyltoluene	10	NC	NC	0.0026	U	0.0027	U
p/m-Xylene	NC	NC	NC	0.0053	U	0.0054	U
sec-Butylbenzene	10	100	11	0.0026	U	0.0027	U
Styrene	NC	NC	NC	0.0053	U	0.0054	U
tert-Butylbenzene	10	100	5.9	0.013	U	0.014	U
Tetrachloroethene	1.4	5.5	1.3	0.0026	U	0.0027	U
Toluene	1.5	100	0.7	0.004	U	0.0041	U
trans-1,2-Dichloroethene	0.3	100	0.19	0.004	U	0.0041	U
trans-1,3-Dichloropropene	NC	NC	NC	0.0026	U	0.0027	U
Trichloroethene	0.7	10	0.47	0.0026	U	0.0027	U
Trichlorofluoromethane	NC	NC	NC	0.013	U	0.014	U
Vinyl acetate	NC	NC	NC	0.026	U	0.027	U
Vinyl chloride	0.2	0.21	0.02	0.0053	U	0.0054	U

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandums

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Bold values exceed unrestricted residential use.

Shaded values exceed restricted residential use.

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-1 (13-15) 7/19/2007 L0710362-01 mg/kg	Qual	TRC-SB-2 (13-15) 7/19/2007 L0710362-02 mg/kg	Qual	TRC-SB-3 (12-14) 7/19/2007 L0710362-03 mg/kg	Qual	TRC-SB-4 (7-9) 7/19/2007 L0710362-04 mg/kg	Qual
Semivolatile Organics by EPA 8270C											
1,2,4,5-Tetrachlorobenzene	NC	NC	NC	7.7	U	1.6	U	1.5	U	15	U
1,2,4-Trichlorobenzene	3.4	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
1,2-Dichlorobenzene	7.9	100	1.1	1.9	U	0.39	U	0.38	U	3.7	U
1,3-Dichlorobenzene	1.6	17	2.4	1.9	U	0.39	U	0.38	U	3.7	U
1,4-Dichlorobenzene	8.5	9.8	1.8	1.9	U	0.39	U	0.38	U	3.7	U
2,4,5-Trichlorophenol	0.1	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
2,4,6-Trichlorophenol	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
2,4-Dichlorophenol	0.4	NC	NC	3.8	U	0.78	U	0.77	U	7.4	U
2,4-Dimethylphenol	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
2,4-Dinitrophenol	0.2	NC	NC	7.7	U	1.6	U	1.5	U	15	U
2,4-Dinitrotoluene	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
2,6-Dinitrotoluene	1	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
2-Chloronaphthalene	NC	NC	NC	2.3	U	0.46	U	0.46	U	4.4	U
2-Chlorophenol	0.8	NC	NC	2.3	U	0.46	U	0.46	U	4.4	U
2-Methylnaphthalene	36.4	NC	NC	8.6		0.39	U	0.38	U	3.7	U
2-Methylphenol	0.1	100	0.33	2.3	U	0.46	U	0.46	U	4.4	U
2-Nitroaniline	0.43	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
2-Nitrophenol	0.33	NC	NC	7.7	U	1.6	U	1.5	U	15	U
3,3'-Dichlorobenzidine	NC	NC	NC	3.8	U	0.78	U	0.77	U	7.4	U
3-Methylphenol/4-Methylphenol	NC	34	0.33	2.3	U	0.46	U	0.46	U	4.4	U
3-Nitroaniline	0.5	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
4,6-Dinitro-o-cresol	NC	NC	NC	7.7	U	1.6	U	1.5	U	15	U
4-Bromophenyl phenyl ether	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
4-Chloroaniline	0.22	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
4-Chlorophenyl phenyl ether	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
4-Nitroaniline	NC	NC	NC	2.7	U	0.54	U	0.54	U	5.2	U
4-Nitrophenol	0.1	NC	NC	3.8	U	0.78	U	0.77	U	7.4	U
Acenaphthene	50	100	20	13		0.39	U	0.38	U	3.7	U
Acenaphthylene	41	100	100	1.9	U	0.39	U	0.38	U	3.7	U
Acetophenone	NC	NC	NC	7.7	U	1.6	U	1.5	U	15	U
Anthracene	50	100	100	40		0.39	U	0.38	U	3.7	U

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-1 (13-15) 7/19/2007 L0710362-01 mg/kg	Qual	TRC-SB-2 (13-15) 7/19/2007 L0710362-02 mg/kg	Qual	TRC-SB-3 (12-14) 7/19/2007 L0710362-03 mg/kg	Qual	TRC-SB-4 (7-9) 7/19/2007 L0710362-04 mg/kg	Qual
Benzo(a)anthracene	0.224	1	1	*40*		0.39	U	0.84		3.7	U
Benzo(a)pyrene	0.061	1	1	*27*		0.39	U	0.73		3.7	U
Benzo(b)fluoranthene	1.1	1	1	*37*		0.39	U	0.6		3.7	U
Benzo(ghi)perylene	50	100	100	16		0.39	U	0.38		3.7	U
Benzo(k)fluoranthene	1.1	1	0.8	*14*		0.39	U	0.64		3.7	U
Benzoic Acid	2.7	NC	NC	19	U	3.9	U	3.8	U	37	U
Benzyl Alcohol	NC	NC	NC	3.8	U	0.78	U	0.77	U	7.4	U
Biphenyl	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Bis(2-chloroethoxy)methane	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Bis(2-chloroethyl)ether	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Bis(2-chloroisopropyl)ether	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Bis(2-Ethylhexyl)phthalate	50	NC	NC	3.8	U	0.78	U	0.77	U	7.4	U
Butyl benzyl phthalate	50	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Carbazole	NC	NC	NC	16		0.39	U	0.38	U	3.7	U
Chrysene	0.4	1	1	*34*		0.39	U	0.7		3.7	U
Di-n-butylphthalate	8.1	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Di-n-octylphthalate	50	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Dibenzo(a,h)anthracene	0.0143	0.33	0.33	*5.2*		0.39	U	0.38	U	3.7	U
Dibenzofuran	6.2	14	7	*22*		0.39	U	0.38	U	3.7	U
Diethyl phthalate	7.1	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Dimethyl phthalate	2	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Fluoranthene	50	100	100	*110*		0.39	U	1.3		3.7	U
Fluorene	50	100	30	18		0.39	U	0.38	U	3.7	U
Hexachlorobenzene	0.41	0.33	0.33	1.9	U	0.39	U	0.38	U	3.7	U
Hexachlorobutadiene	NC	NC	NC	3.8	U	0.78	U	0.77	U	7.4	U
Hexachlorocyclopentadiene	NC	NC	NC	3.8	U	0.78	U	0.77	U	7.4	U
Hexachloroethane	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Indeno(1,2,3-cd)Pyrene	3.2	0.5	0.5	*19*		0.39	U	**0.58**		3.7	U
Isophorone	4.4	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
n-Nitrosodi-n-propylamine	NC	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Naphthalene	13	100	12	*15*		0.39	U	0.38	U	3.7	U
Nitrobenzene	0.2	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
NitrosoDiPhenylAmine(NDPA)/DPA	NC	NC	NC	5.7	U	1.2	U	1.1	U	11	U
P-Chloro-M-Cresol	0.24	NC	NC	1.9	U	0.39	U	0.38	U	3.7	U
Pentachlorophenol	1	2.4	0.8	7.7	U	1.6	U	1.5	U	15	U
Phenanthrene	50	100	100	*140*		0.39	U	0.38		3.7	U
Phenol	0.03	100	0.33	2.7	U	0.54	U	0.54	U	5.2	U
Pyrene	50	100	100	75		0.39	U	1.1		3.7	U

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U - Concentration less than the minimum laboratory detection limit
NC - No guidance criteria established for this compound
Bold values exceed unrestricted residential use
Shaded values exceed restricted residential use.
Italicized values exceed TAGM criteria

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-5 (23-25) 7/19/2007 L0710362-05 mg/kg	Qual	TRC-SB-6 (15-17) 7/19/2007 L0710362-06 mg/kg	Qual	TRC-SB-7 (18-20) 7/19/2007 L0710362-07 mg/kg	Qual	TRC-SB-8 (18-20) 7/19/2007 L0710362-08 mg/kg	Qual
Semivolatile Organics by EPA 8270C											
1,2,4,5-Tetrachlorobenzene	NC	NC	NC	1.6	U	1.5	U	1.5	U	1.6	U
1,2,4-Trichlorobenzene	3.4	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
1,2-Dichlorobenzene	7.9	100	1.1	0.39	U	0.37	U	0.37	U	0.39	U
1,3-Dichlorobenzene	1.6	17	2.4	0.39	U	0.37	U	0.37	U	0.39	U
1,4-Dichlorobenzene	8.5	9.8	1.8	0.39	U	0.37	U	0.37	U	0.39	U
2,4,5-Trichlorophenol	0.1	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
2,4,6-Trichlorophenol	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
2,4-Dichlorophenol	0.4	NC	NC	0.78	U	0.74	U	0.73	U	0.78	U
2,4-Dimethylphenol	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
2,4-Dinitrophenol	0.2	NC	NC	1.6	U	1.5	U	1.5	U	1.6	U
2,4-Dinitrotoluene	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
2,6-Dinitrotoluene	1	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
2-Chloronaphthalene	NC	NC	NC	0.47	U	0.44	U	0.44	U	0.47	U
2-Chlorophenol	0.8	NC	NC	0.47	U	0.44	U	0.44	U	0.47	U
2-Methylnaphthalene	36.4	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
2-Methylphenol	0.1	100	0.33	0.47	U	0.44	U	0.44	U	0.47	U
2-Nitroaniline	0.43	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
2-Nitrophenol	0.33	NC	NC	1.6	U	1.5	U	1.5	U	1.6	U
3,3'-Dichlorobenzidine	NC	NC	NC	0.78	U	0.74	U	0.73	U	0.78	U
3-Methylphenol/4-Methylphenol	NC	34	0.33	0.47	U	0.44	U	0.44	U	0.47	U
3-Nitroaniline	0.5	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
4,6-Dinitro-o-cresol	NC	NC	NC	1.6	U	1.5	U	1.5	U	1.6	U
4-Bromophenyl phenyl ether	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
4-Chloroaniline	0.22	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
4-Chlorophenyl phenyl ether	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
4-Nitroaniline	NC	NC	NC	0.55	U	0.52	U	0.51	U	0.55	U
4-Nitrophenol	0.1	NC	NC	0.78	U	0.74	U	0.73	U	0.78	U
Acenaphthene	50	100	20	0.39	U	0.37	U	0.37	U	0.39	U
Acenaphthylene	41	100	100	0.39	U	0.37	U	0.37	U	0.39	U
Acetophenone	NC	NC	NC	1.6	U	1.5	U	1.5	U	1.6	U
Anthracene	50	100	100	0.39	U	0.37	U	0.41		0.39	U

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-5 (23-25) 7/19/2007 L0710362-05 mg/kg	Qual	TRC-SB-6 (15-17) 7/19/2007 L0710362-06 mg/kg	Qual	TRC-SB-7 (18-20) 7/19/2007 L0710362-07 mg/kg	Qual	TRC-SB-8 (18-20) 7/19/2007 L0710362-08 mg/kg	Qual
Benzo(a)anthracene	0.224	1	1	0.39	U	0.37	U	0.79		0.39	U
Benzo(a)pyrene	0.061	1	1	0.39	U	0.37	U	0.71		0.39	U
Benzo(b)fluoranthene	1.1	1	1	0.39	U	0.37	U	0.67		0.39	U
Benzo(ghi)perylene	50	100	100	0.39	U	0.37	U	0.62		0.39	U
Benzo(k)fluoranthene	1.1	1	0.8	0.39	U	0.37	U	0.58		0.39	U
Benzoic Acid	2.7	NC	NC	3.9	U	3.7	U	3.7	U	3.9	U
Benzyl Alcohol	NC	NC	NC	0.78	U	0.74	U	0.73	U	0.78	U
Biphenyl	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Bis(2-chloroethoxy)methane	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Bis(2-chloroethyl)ether	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Bis(2-chloroisopropyl)ether	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Bis(2-Ethylhexyl)phthalate	50	NC	NC	0.78	U	0.74	U	0.73	U	0.78	U
Butyl benzyl phthalate	50	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Carbazole	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Chrysene	0.4	1	1	0.39	U	0.37	U	0.72		0.39	U
Di-n-butylphthalate	8.1	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Di-n-octylphthalate	50	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Dibenzo(a,h)anthracene	0.0143	0.33	0.33	0.39	U	0.37	U	0.37	U	0.39	U
Dibenzofuran	6.2	14	7	0.39	U	0.37	U	0.37	U	0.39	U
Diethyl phthalate	7.1	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Dimethyl phthalate	2	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Fluoranthene	50	100	100	0.39	U	0.37	U	1.6		0.39	U
Fluorene	50	100	30	0.39	U	0.37	U	0.37	U	0.39	U
Hexachlorobenzene	0.41	0.33	0.33	0.39	U	0.37	U	0.37	U	0.39	U
Hexachlorobutadiene	NC	NC	NC	0.78	U	0.74	U	0.73	U	0.78	U
Hexachlorocyclopentadiene	NC	NC	NC	0.78	U	0.74	U	0.73	U	0.78	U
Hexachloroethane	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Indeno(1,2,3-cd)Pyrene	3.2	0.5	0.5	0.39	U	0.37	U	0.63		0.39	U
Isophorone	4.4	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
n-Nitrosodi-n-propylamine	NC	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Naphthalene	13	100	12	0.39	U	0.37	U	0.37	U	0.39	U
Nitrobenzene	0.2	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
NitrosoDiPhenylAmine(NDPA)/DPA	NC	NC	NC	1.2	U	1.1	U	1.1	U	1.2	U
P-Chloro-M-Cresol	0.24	NC	NC	0.39	U	0.37	U	0.37	U	0.39	U
Pentachlorophenol	1	2.4	0.8	1.6	U	1.5	U	1.5	U	1.6	U
Phenanthrene	50	100	100	0.39	U	0.37	U	1.3		0.39	U
Phenol	0.03	100	0.33	0.55	U	0.52	U	0.51	U	0.55	U
Pyrene	50	100	100	0.39	U	0.37	U	1.3		0.39	U

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandums

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Italicized valhues exceed TAGM criteria

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-8 (23-25) 7/19/2007 L0710362-09 mg/kg	Qual	TRC-SB-9 (24-26) 7/19/2007 L0710362-10 mg/kg	Qual	TRC-SB-10 (16-18) 7/19/2007 L0710362-11 mg/kg	Qual	TRC-SB-11 (10-12) 7/19/2007 L0710362-12 mg/kg	Qual
Semivolatile Organics by EPA 8270C											
1,2,4,5-Tetrachlorobenzene	NC	NC	NC	1.6	U	1.4	U	1.4	U	1.4	U
1,2,4-Trichlorobenzene	3.4	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
1,2-Dichlorobenzene	7.9	100	1.1	0.39	U	0.35	U	0.36	U	0.35	U
1,3-Dichlorobenzene	1.6	17	2.4	0.39	U	0.35	U	0.36	U	0.35	U
1,4-Dichlorobenzene	8.5	9.8	1.8	0.39	U	0.35	U	0.36	U	0.35	U
2,4,5-Trichlorophenol	0.1	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
2,4,6-Trichlorophenol	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
2,4-Dichlorophenol	0.4	NC	NC	0.78	U	0.71	U	0.72	U	0.71	U
2,4-Dimethylphenol	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
2,4-Dinitrophenol	0.2	NC	NC	1.6	U	1.4	U	1.4	U	1.4	U
2,4-Dinitrotoluene	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
2,6-Dinitrotoluene	1	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
2-Chloronaphthalene	NC	NC	NC	0.47	U	0.42	U	0.43	U	0.42	U
2-Chlorophenol	0.8	NC	NC	0.47	U	0.42	U	0.43	U	0.42	U
2-Methylnaphthalene	36.4	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
2-Methylphenol	0.1	100	0.33	0.47	U	0.42	U	0.43	U	0.42	U
2-Nitroaniline	0.43	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
2-Nitrophenol	0.33	NC	NC	1.6	U	1.4	U	1.4	U	1.4	U
3,3'-Dichlorobenzidine	NC	NC	NC	0.78	U	0.71	U	0.72	U	0.71	U
3-Methylphenol/4-Methylphenol	NC	34	0.33	0.47	U	0.42	U	0.43	U	0.42	U
3-Nitroaniline	0.5	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
4,6-Dinitro-o-cresol	NC	NC	NC	1.6	U	1.4	U	1.4	U	1.4	U
4-Bromophenyl phenyl ether	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
4-Chloroaniline	0.22	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
4-Chlorophenyl phenyl ether	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
4-Nitroaniline	NC	NC	NC	0.55	U	0.5	U	0.51	U	0.5	U
4-Nitrophenol	0.1	NC	NC	0.78	U	0.71	U	0.72	U	0.71	U
Acenaphthene	50	100	20	0.39	U	0.35	U	0.36	U	0.35	U
Acenaphthylene	41	100	100	0.39	U	0.35	U	0.36	U	0.35	U
Acetophenone	NC	NC	NC	1.6	U	1.4	U	1.4	U	1.4	U
Anthracene	50	100	100	0.39	U	0.35	U	0.36	U	0.35	U

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-8 (23-25) 7/19/2007 L0710362-09 mg/kg	Qual	TRC-SB-9 (24-26) 7/19/2007 L0710362-10 mg/kg	Qual	TRC-SB-10 (16-18) 7/19/2007 L0710362-11 mg/kg	Qual	TRC-SB-11 (10-12) 7/19/2007 L0710362-12 mg/kg	Qual
Benzo(a)anthracene	0.224	1	1	0.39	U	0.35	U	0.36	U	0.35	U
Benzo(a)pyrene	0.061	1	1	0.39	U	0.35	U	0.36	U	0.35	U
Benzo(b)fluoranthene	1.1	1	1	0.39	U	0.35	U	0.36	U	0.35	U
Benzo(ghi)perylene	50	100	100	0.39	U	0.35	U	0.36	U	0.35	U
Benzo(k)fluoranthene	1.1	1	0.8	0.39	U	0.35	U	0.36	U	0.35	U
Benzoic Acid	2.7	NC	NC	3.9	U	3.5	U	3.6	U	3.5	U
Benzyl Alcohol	NC	NC	NC	0.78	U	0.71	U	0.72	U	0.71	U
Biphenyl	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Bis(2-chloroethoxy)methane	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Bis(2-chloroethyl)ether	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Bis(2-chloroisopropyl)ether	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Bis(2-Ethylhexyl)phthalate	50	NC	NC	0.78	U	0.71	U	0.72	U	0.71	U
Butyl benzyl phthalate	50	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Carbazole	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Chrysene	0.4	1	1	0.39	U	0.35	U	0.36	U	0.35	U
Di-n-butylphthalate	8.1	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Di-n-octylphthalate	50	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Dibenzo(a,h)anthracene	0.0143	0.33	0.33	0.39	U	0.35	U	0.36	U	0.35	U
Dibenzofuran	6.2	14	7	0.39	U	0.35	U	0.36	U	0.35	U
Diethyl phthalate	7.1	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Dimethyl phthalate	2	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Fluoranthene	50	100	100	0.39	U	0.35	U	0.36	U	0.35	U
Fluorene	50	100	30	0.39	U	0.35	U	0.36	U	0.35	U
Hexachlorobenzene	0.41	0.33	0.33	0.39	U	0.35	U	0.36	U	0.35	U
Hexachlorobutadiene	NC	NC	NC	0.78	U	0.71	U	0.72	U	0.71	U
Hexachlorocyclopentadiene	NC	NC	NC	0.78	U	0.71	U	0.72	U	0.71	U
Hexachloroethane	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Indeno(1,2,3-cd)Pyrene	3.2	0.5	0.5	0.39	U	0.35	U	0.36	U	0.35	U
Isophorone	4.4	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
n-Nitrosodi-n-propylamine	NC	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Naphthalene	13	100	12	0.39	U	0.35	U	0.36	U	0.35	U
Nitrobenzene	0.2	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
NitrosoDiPhenylAmine(NDPA)/DPA	NC	NC	NC	1.2	U	1.1	U	1.1	U	1.1	U
P-Chloro-M-Cresol	0.24	NC	NC	0.39	U	0.35	U	0.36	U	0.35	U
Pentachlorophenol	1	2.4	0.8	1.6	U	1.4	U	1.4	U	1.4	U
Phenanthrene	50	100	100	0.39	U	0.35	U	0.36	U	0.35	U
Phenol	0.03	100	0.33	0.55	U	0.5	U	0.51	U	0.5	U
Pyrene	50	100	100	0.39	U	0.35	U	0.36	U	0.35	U

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandums

Represents restricted residential use prohibits use of single family housing and vegetable gardens. Includes active recreational uses, which are public uses with a reasonable potential for soil contact. Restrictions on the use of groundwater are allowed
U - Concentration less than the minimum laboratory detection limit.
NC - No guidance criteria established for this compound
Bold values exceed unrestricted residential use.
Shaded values exceed restricted residential use.
Italicized values exceed TAGM criteria

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-12 (11-12) 7/19/2007 L0710362-13 mg/kg	Qual	TRC-SB-13 (15-17) 7/19/2007 L0710362-15 mg/kg	Qual
Semivolatile Organics by EPA 8270C							
1,2,4,5-Tetrachlorobenzene	NC	NC	NC	1.4	U	1.4	U
1,2,4-Trichlorobenzene	3.4	NC	NC	0.35	U	0.36	U
1,2-Dichlorobenzene	7.9	100	1.1	0.35	U	0.36	U
1,3-Dichlorobenzene	1.6	17	2.4	0.35	U	0.36	U
1,4-Dichlorobenzene	8.5	9.8	1.8	0.35	U	0.36	U
2,4,5-Trichlorophenol	0.1	NC	NC	0.35	U	0.36	U
2,4,6-Trichlorophenol	NC	NC	NC	0.35	U	0.36	U
2,4-Dichlorophenol	0.4	NC	NC	0.71	U	0.72	U
2,4-Dimethylphenol	NC	NC	NC	0.35	U	0.36	U
2,4-Dinitrophenol	0.2	NC	NC	1.4	U	1.4	U
2,4-Dinitrotoluene	NC	NC	NC	0.35	U	0.36	U
2,6-Dinitrotoluene	1	NC	NC	0.35	U	0.36	U
2-Chloronaphthalene	NC	NC	NC	0.42	U	0.43	U
2-Chlorophenol	0.8	NC	NC	0.42	U	0.43	U
2-Methylnaphthalene	36.4	NC	NC	0.35	U	0.36	U
2-Methylphenol	0.1	100	0.33	0.42	U	0.43	U
2-Nitroaniline	0.43	NC	NC	0.35	U	0.36	U
2-Nitrophenol	0.33	NC	NC	1.4	U	1.4	U
3,3'-Dichlorobenzidine	NC	NC	NC	0.71	U	0.72	U
3-Methylphenol/4-Methylphenol	NC	34	0.33	0.42	U	0.43	U
3-Nitroaniline	0.5	NC	NC	0.35	U	0.36	U
4,6-Dinitro-o-cresol	NC	NC	NC	1.4	U	1.4	U
4-Bromophenyl phenyl ether	NC	NC	NC	0.35	U	0.36	U
4-Chloroaniline	0.22	NC	NC	0.35	U	0.36	U
4-Chlorophenyl phenyl ether	NC	NC	NC	0.35	U	0.36	U
4-Nitroaniline	NC	NC	NC	0.5	U	0.51	U
4-Nitrophenol	0.1	NC	NC	0.71	U	0.72	U
Acenaphthene	50	100	20	0.35	U	0.36	U
Acenaphthylene	41	100	100	0.35	U	0.36	U
Acetophenone	NC	NC	NC	1.4	U	1.4	U
Anthracene	50	100	100	0.35	U	0.36	U

Table 2
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Compound List - SVOCs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-12 (11-12) 7/19/2007 L0710362-13 mg/kg	Qual	TRC-SB-13 (15-17) 7/19/2007 L0710362-15 mg/kg	Qual
Benzo(a)anthracene	0.224	1	1	0.35	U	0.36	U
Benzo(a)pyrene	0.061	1	1	0.35	U	0.36	U
Benzo(b)fluoranthene	1.1	1	1	0.35	U	0.36	U
Benzo(ghi)perylene	50	100	100	0.35	U	0.36	U
Benzo(k)fluoranthene	1.1	1	0.8	0.35	U	0.36	U
Benzoic Acid	2.7	NC	NC	3.5	U	3.6	U
Benzyl Alcohol	NC	NC	NC	0.71	U	0.72	U
Biphenyl	NC	NC	NC	0.35	U	0.36	U
Bis(2-chloroethoxy)methane	NC	NC	NC	0.35	U	0.36	U
Bis(2-chloroethyl)ether	NC	NC	NC	0.35	U	0.36	U
Bis(2-chloroisopropyl)ether	NC	NC	NC	0.35	U	0.36	U
Bis(2-Ethylhexyl)phthalate	50	NC	NC	0.71	U	0.72	U
Butyl benzyl phthalate	50	NC	NC	0.35	U	0.36	U
Carbazole	NC	NC	NC	0.35	U	0.36	U
Chrysene	0.4	1	1	0.35	U	0.36	U
Di-n-butylphthalate	8.1	NC	NC	0.35	U	0.36	U
Di-n-octylphthalate	50	NC	NC	0.35	U	0.36	U
Dibenzo(a,h)anthracene	0.0143	0.33	0.33	0.35	U	0.36	U
Dibenzofuran	6.2	14	7	0.35	U	0.36	U
Diethyl phthalate	7.1	NC	NC	0.35	U	0.36	U
Dimethyl phthalate	2	NC	NC	0.35	U	0.36	U
Fluoranthene	50	100	100	0.35	U	0.36	U
Fluorene	50	100	30	0.35	U	0.36	U
Hexachlorobenzene	0.41	0.33	0.33	0.35	U	0.36	U
Hexachlorobutadiene	NC	NC	NC	0.71	U	0.72	U
Hexachlorocyclopentadiene	NC	NC	NC	0.71	U	0.72	U
Hexachloroethane	NC	NC	NC	0.35	U	0.36	U
Indeno(1,2,3-cd)Pyrene	3.2	0.5	0.5	0.35	U	0.36	U
Isophorone	4.4	NC	NC	0.35	U	0.36	U
n-Nitrosodi-n-propylamine	NC	NC	NC	0.35	U	0.36	U
Naphthalene	13	100	12	0.35	U	0.36	U
Nitrobenzene	0.2	NC	NC	0.35	U	0.36	U
NitrosoDiPhenylAmine(NDPA)/DPA	NC	NC	NC	1.1	U	1.1	U
P-Chloro-M-Cresol	0.24	NC	NC	0.35	U	0.36	U
Pentachlorophenol	1	2.4	0.8	1.4	U	1.4	U
Phenanthrene	50	100	100	0.35	U	0.36	U
Phenol	0.03	100	0.33	0.5	U	0.51	U
Pyrene	50	100	100	0.35	U	0.36	U

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Represents restricted residential use prohibits use of single family housing and vegetable gardens. Includes active recreational uses, which are public uses with a reasonable potential for soil contact. Restrictions on the use of groundwater are allowed
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Italicized vallues exceed TAGM criteria

Table 3
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
TCLP - SVOC

LOCATION SAMPLING DATE LAB SAMPLE ID Units	TOGS GA STANDARD ug/L	TRC-SB-8 (18-20) 7/19/2007 L0710362-08 ug/L	Qual
TCLP Semi-Volatile Organics			
2,4,5-Trichlorophenol	**NC**	25	U
2,4,6-Trichlorophenol	**NC**	25	U
2,4-Dinitrotoluene	**5**	30	U
2-Methylphenol	**NC**	30	U
3-Methylphenol/4-Methylphenol	**NC**	30	U
Hexachlorobenzene	**0.04**	25	U
Hexachlorobutadiene	**0.5**	50	U
Hexachloroethane	**5**	25	U
Nitrobenzene	**0.4**	25	U
Pentachlorophenol	**1**	50	U
Pyridine	**50**	250	U

U - Concentration less than the minimum laboratory detection limit.
NC - No guidance criteria established for this compound.

Table 4
Kingsbridge Armory
Bronx, New York
Phase II Environmental Assessment
Target Compound List -
Pesticides and PCBs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj.	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-1 (13-15) 7/19/2007 L0710362-01 mg/kg	Qual	TRC-SB-2 (13-15) 7/19/2007 L0710362-02 mg/kg	Qual	TRC-SB-3 (12-14) 7/19/2007 L0710362-03 mg/kg	Qual
Organochlorine Pesticides by EPA 8081A									
4,4'-DDD	2.9	2.6	0.0033	0.153	U	0.0194	U	0.0192	U
4,4'-DDE	2.1	1.8	0.0033	0.153	U	0.0194	U	0.0192	U
4,4'-DDT	2.1	1.7	0.0033	0.153	U	0.0194	U	0.0192	U
Aldrin	0.041	0.019	0.005	0.153	U	0.0194	U	0.0192	U
Alpha-BHC	0.11	0.097	0.02	0.153	U	0.0194	U	0.0192	U
Beta-BHC	0.2	0.072	0.036	0.153	U	0.0194	U	0.0192	U
Chlordane	0.54	NC	NC	0.613	U	0.0775	U	0.0766	U
Delta-BHC	0.3	100	0.04	0.153	U	0.0194	U	0.0192	U
Dieldrin	0.044	0.039	0.005	0.153	U	0.0194	U	0.0192	U
Endosulfan I	0.9	4.8	2.4	0.153	U	0.0194	U	0.0192	U
Endosulfan II	0.9	4.8	2.4	0.153	U	0.0194	U	0.0192	U
Endosulfan sulfate	1	4.8	2.4	0.153	U	0.0194	U	0.0192	U
Endrin	0.1	2.2	0.014	0.153	U	0.0194	U	0.0192	U
Endrin keytone	NC	NC	NC	0.153	U	0.0194	U	0.0192	U
Heptachlor	0.1	0.42	0.042	0.153	U	0.0194	U	0.0192	U
Heptachlor epoxide	0.02	NC	NC	0.153	U	0.0194	U	0.0192	U
Lindane	0.06	0.28	0.1	0.153	U	0.0194	U	0.0192	U
Methoxychlor	10	NC	NC	0.613	U	0.0775	U	0.0766	U
trans-Chlordane	NC	NC	NC	0.153	U	0.0194	U	0.0192	U
Polychlorinated Biphenyls by EPA 8082									
Aroclor 1016	10	1	0.1	0.0766	U	0.0388	U	0.0383	U
Aroclor 1221	10	1	0.1	0.0766	U	0.0388	U	0.0383	U
Aroclor 1232	10	1	0.1	0.0766	U	0.0388	U	0.0383	U
Aroclor 1242	10	1	0.1	0.0766	U	0.0388	U	0.0383	U
Aroclor 1248	10	1	0.1	0.0766	U	0.0388	U	0.0383	U
Aroclor 1254	10	1	0.1	0.0766	U	0.0388	U	0.0383	U
Aroclor 1260	10	1	0.1	0.0766	U	0.0388	U	0.0383	U

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Table 4
Kingsbridge Armory
Bronx, New York
Phase II Environmental Assessment
Target Compound List -
Pesticides and PCBs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj.	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-4 (7-9) 7/19/2007 L0710362-04 mg/kg	Qual	TRC-SB-5 (23-25) 7/19/2007 L0710362-05 mg/kg	Qual	TRC-SB-6 (15-17) 7/19/2007 L0710362-06 mg/kg	Qual
Organochlorine Pesticides by EPA 8081A									
4,4'-DDD	2.9	2.6	0.0033	0.148	U	0.00392	U	0.0185	U
4,4'-DDE	2.1	1.8	0.0033	0.148	U	0.00392	U	0.0185	U
4,4'-DDT	2.1	1.7	0.0033	0.148	U	0.00392	U	0.0185	U
Aldrin	0.041	0.019	0.005	0.148	U	0.00392	U	0.0185	U
Alpha-BHC	0.11	0.097	0.02	0.148	U	0.00392	U	0.0185	U
Beta-BHC	0.2	0.072	0.036	0.148	U	0.00392	U	0.0185	U
Chlordane	0.54	NC	NC	0.592	U	0.0157	U	0.0741	U
Delta-BHC	0.3	100	0.04	0.148	U	0.00392	U	0.0185	U
Dieldrin	0.044	0.039	0.005	0.148	U	0.00392	U	0.0185	U
Endosulfan I	0.9	4.8	2.4	0.148	U	0.00392	U	0.0185	U
Endosulfan II	0.9	4.8	2.4	0.148	U	0.00392	U	0.0185	U
Endosulfan sulfate	1	4.8	2.4	0.148	U	0.00392	U	0.0185	U
Endrin	0.1	2.2	0.014	0.148	U	0.00392	U	0.0185	U
Endrin keytone	NC	NC	NC	0.148	U	0.00392	U	0.0185	U
Heptachlor	0.1	0.42	0.042	0.148	U	0.00392	U	0.0185	U
Heptachlor epoxide	0.02	NC	NC	0.148	U	0.00392	U	0.0185	U
Lindane	0.06	0.28	0.1	0.148	U	0.00392	U	0.0185	U
Methoxychlor	10	NC	NC	0.592	U	0.0157	U	0.0741	U
trans-Chlordane	NC	NC	NC	0.148	U	0.00392	U	0.0185	U
Polychlorinated Biphenyls by EPA 8082									
Aroclor 1016	10	1	0.1	0.037	U	0.0392	U	0.037	U
Aroclor 1221	10	1	0.1	0.037	U	0.0392	U	0.037	U
Aroclor 1232	10	1	0.1	0.037	U	0.0392	U	0.037	U
Aroclor 1242	10	1	0.1	0.037	U	0.0392	U	0.037	U
Aroclor 1248	10	1	0.1	0.037	U	0.0392	U	0.037	U
Aroclor 1254	10	1	0.1	0.037	U	0.0392	U	0.037	U
Aroclor 1260	10	1	0.1	0.037	U	0.0392	U	0.037	U

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Table 4
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Bronx, New York
Phase II Environmental Assessment
Target Compound List -
Pesticides and PCBs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj.	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-7 (18-20) 7/19/2007 L0710362-07 mg/kg	Qual	TRC-SB-8 (18-20) 7/19/2007 L0710362-08 mg/kg	Qual	TRC-SB-8 (23-25) 7/19/2007 L0710362-09 mg/kg	Qual
Organochlorine Pesticides by EPA 8081A									
4,4'-DDD	2.9	2.6	0.0033	0.0183	U	0.0196	U	0.00392	U
4,4'-DDE	2.1	1.8	0.0033	0.0183	U	0.0196	U	0.00392	U
4,4'-DDT	2.1	1.7	0.0033	0.0183	U	0.0196	U	0.00392	U
Aldrin	0.041	0.019	0.005	0.0183	U	0.0196	U	0.00392	U
Alpha-BHC	0.11	0.097	0.02	0.0183	U	0.0196	U	0.00392	U
Beta-BHC	0.2	0.072	0.036	0.0183	U	0.0196	U	0.00392	U
Chlordane	0.54	NC	NC	0.0733	U	0.0784	U	0.0157	U
Delta-BHC	0.3	100	0.04	0.0183	U	0.0196	U	0.00392	U
Dieldrin	0.044	0.039	0.005	0.0183	U	0.0196	U	0.00392	U
Endosulfan I	0.9	4.8	2.4	0.0183	U	0.0196	U	0.00392	U
Endosulfan II	0.9	4.8	2.4	0.0183	U	0.0196	U	0.00392	U
Endosulfan sulfate	1	4.8	2.4	0.0183	U	0.0196	U	0.00392	U
Endrin	0.1	2.2	0.014	0.0183	U	0.0196	U	0.00392	U
Endrin keytone	NC	NC	NC	0.0183	U	0.0196	U	0.00392	U
Heptachlor	0.1	0.42	0.042	0.0183	U	0.0196	U	0.00392	U
Heptachlor epoxide	0.02	NC	NC	0.0183	U	0.0196	U	0.00392	U
Lindane	0.06	0.28	0.1	0.0183	U	0.0196	U	0.00392	U
Methoxychlor	10	NC	NC	0.0733	U	0.0784	U	0.0157	U
trans-Chlordane	NC	NC	NC	0.0183	U	0.0196	U	0.00392	U
Polychlorinated Biphenyls by EPA 8082									
Aroclor 1016	10	1	0.1	0.0366	U	0.0392	U	0.0392	U
Aroclor 1221	10	1	0.1	0.0366	U	0.0392	U	0.0392	U
Aroclor 1232	10	1	0.1	0.0366	U	0.0392	U	0.0392	U
Aroclor 1242	10	1	0.1	0.0366	U	0.0392	U	0.0392	U
Aroclor 1248	10	1	0.1	0.0366	U	0.0392	U	0.0392	U
Aroclor 1254	10	1	0.1	0.0366	U	0.0392	U	0.0392	U
Aroclor 1260	10	1	0.1	0.0366	U	0.0392	U	0.0392	U

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Kingsbridge Armory
Bronx, New York
Phase II Environmental Assessment
Target Compound List -
Pesticides and PCBs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj.	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-9 (24-26) 7/19/2007 L0710362-10 mg/kg	Qual	TRC-SB-10 (16-18) 7/19/2007 L0710362-11 mg/kg	Qual	TRC-SB-11 (10-12) 7/19/2007 L0710362-12 mg/kg	Qual
Organochlorine Pesticides by EPA 8081A									
4,4'-DDD	2.9	2.6	0.0033	0.00355	U	0.00362	U	0.00355	U
4,4'-DDE	2.1	1.8	0.0033	0.00355	U	0.00362	U	0.00355	U
4,4'-DDT	2.1	1.7	0.0033	0.00355	U	0.00362	U	0.00355	U
Aldrin	0.041	0.019	0.005	0.00355	U	0.00362	U	0.00355	U
Alpha-BHC	0.11	0.097	0.02	0.00355	U	0.00362	U	0.00355	U
Beta-BHC	0.2	0.072	0.036	0.00355	U	0.00362	U	0.00355	U
Chlordane	0.54	NC	NC	0.0142	U	0.0145	U	0.0142	U
Delta-BHC	0.3	100	0.04	0.00355	U	0.00362	U	0.00355	U
Dieldrin	0.044	0.039	0.005	0.00355	U	0.00362	U	0.00355	U
Endosulfan I	0.9	4.8	2.4	0.00355	U	0.00362	U	0.00355	U
Endosulfan II	0.9	4.8	2.4	0.00355	U	0.00362	U	0.00355	U
Endosulfan sulfate	1	4.8	2.4	0.00355	U	0.00362	U	0.00355	U
Endrin	0.1	2.2	0.014	0.00355	U	0.00362	U	0.00355	U
Endrin keytone	NC	NC	NC	0.00355	U	0.00362	U	0.00355	U
Heptachlor	0.1	0.42	0.042	0.00355	U	0.00362	U	0.00355	U
Heptachlor epoxide	0.02	NC	NC	0.00355	U	0.00362	U	0.00355	U
Lindane	0.06	0.28	0.1	0.00355	U	0.00362	U	0.00355	U
Methoxychlor	10	NC	NC	0.0142	U	0.0145	U	0.0142	U
trans-Chlordane	NC	NC	NC	0.00355	U	0.00362	U	0.00355	U
Polychlorinated Biphenyls by EPA 8082									
Aroclor 1016	10	1	0.1	0.0355	U	0.0362	U	0.0355	U
Aroclor 1221	10	1	0.1	0.0355	U	0.0362	U	0.0355	U
Aroclor 1232	10	1	0.1	0.0355	U	0.0362	U	0.0355	U
Aroclor 1242	10	1	0.1	0.0355	U	0.0362	U	0.0355	U
Aroclor 1248	10	1	0.1	0.0355	U	0.0362	U	0.0355	U
Aroclor 1254	10	1	0.1	0.0355	U	0.0362	U	0.0355	U
Aroclor 1260	10	1	0.1	0.0355	U	0.0362	U	0.0355	U

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Phase II Environmental Assessment
Target Compound List -
Pesticides and PCBs

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj.	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-12 (11-12) 7/19/2007 L0710362-13 mg/kg	Qual	TRC-SB-13 (15-17) 7/19/2007 L0710362-15 mg/kg	Qual
Organochlorine Pesticides by EPA 8081A							
4,4'-DDD	2.9	2.6	0.0033	0.00355	U	0.0181	U
4,4'-DDE	2.1	1.8	0.0033	0.00355	U	0.0181	U
4,4'-DDT	2.1	1.7	0.0033	0.00355	U	0.0181	U
Aldrin	0.041	0.019	0.005	0.00355	U	0.0181	U
Alpha-BHC	0.11	0.097	0.02	0.00355	U	0.0181	U
Beta-BHC	0.2	0.072	0.036	0.00355	U	0.0181	U
Chlordane	0.54	NC	NC	0.0142	U	0.0725	U
Delta-BHC	0.3	100	0.04	0.00355	U	0.0181	U
Dieldrin	0.044	0.039	0.005	0.00355	U	0.0181	U
Endosulfan I	0.9	4.8	2.4	0.00355	U	0.0181	U
Endosulfan II	0.9	4.8	2.4	0.00355	U	0.0181	U
Endosulfan sulfate	1	4.8	2.4	0.00355	U	0.0181	U
Endrin	0.1	2.2	0.014	0.00355	U	0.0181	U
Endrin keytone	NC	NC	NC	0.00355	U	0.0181	U
Heptachlor	0.1	0.42	0.042	0.00355	U	0.0181	U
Heptachlor epoxide	0.02	NC	NC	0.00355	U	0.0181	U
Lindane	0.06	0.28	0.1	0.00355	U	0.0181	U
Methoxychlor	10	NC	NC	0.0142	U	0.0725	U
trans-Chlordane	NC	NC	NC	0.00355	U	0.0181	U
Polychlorinated Biphenyls by EPA 8082							
Aroclor 1016	10	1	0.1	0.0355	U	0.0362	U
Aroclor 1221	10	1	0.1	0.0355	U	0.0362	U
Aroclor 1232	10	1	0.1	0.0355	U	0.0362	U
Aroclor 1242	10	1	0.1	0.0355	U	0.0362	U
Aroclor 1248	10	1	0.1	0.0355	U	0.0362	U
Aroclor 1254	10	1	0.1	0.0355	U	0.0362	U
Aroclor 1260	10	1	0.1	0.0355	U	0.0362	U

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Table 5
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Analyte List - Metals

LOCATION SAMPLING DATE LAB SAMPLE ID Units	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-1 (13-15) 7/19/2007 L0710362-01 mg/kg	Qual	TRC-SB-2 (13-15) 7/19/2007 L0710362-02 mg/kg	Qual	TRC-SB-3 (12-14) 7/19/2007 L0710362-03 mg/kg	Qual
Total Metals									
Aluminum, Total	SB	NC	NC	13000		12000		6800	
Antimony, Total	SB	NC	NC	2.3	U	2.3	U	2.3	U
Arsenic, Total	7.5*	16	13	2.9		2.4		2.3	
Barium, Total	300*	350	350	100		120		67	
Beryllium, Total	0.16	14	7.2	*0.69*		*0.54*		*0.4*	
Cadmium, Total	1*	2.5	2.5	0.46	U	0.46	U	0.46	U
Calcium, Total	SB	NC	NC	6500		3800		5300	
Chromium, Total	10	NC	NC	*26*		*24*		*21*	
Cobalt, Total	30	NC	NC	8.1		8.4		5	
Copper, Total	25	270	50	*46*		20		20	
Iron, Total	2000*	NC	NC	*18000*		*17000*		*13000*	
Lead, Total	200-500	400	63	78		21		140	
Magnesium, Total	SB	NC	NC	6300		7800		3600	
Manganese, Total	SB	2000	1600	240		270		160	
Mercury, Total	0.1	0.81	0.18	0.1	U	0.1		0.19	
Nickel, Total	13	140	30	*16*		*14*		11	
Potassium, Total	SB	NC	NC	3200		3700		1400	
Selenium, Total	2	36	3.9	2.3	U	2.3	U	2.3	U
Silver, Total	SB	36	2	0.46	U	0.46	U	0.46	U
Sodium, Total	SB	NC	NC	360		390		330	
Thallium, Total	SB	NC	NC	2.3	U	2.3	U	2.3	U
Vanadium, Total	150*	NC	NC	41		37		23	
Zinc, Total	20	2200	109	*91*		*61*		*66*	

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U - Concentration less than the minimum laboratory detection limit
NC - No guidance criteria established for this compound
SB - Site background
* - given value or site background
Bold values exceed unrestricted residential use.
Italicized values exceed TAGM criteria

Table 5
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Analyte List - Metals

LOCATION SAMPLING DATE LAB SAMPLE ID Units	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-4 (7-9) 7/19/2007 L0710362-04 mg/kg	Qual	TRC-SB-5 (23-25) 7/19/2007 L0710362-05 mg/kg	Qual	TRC-SB-6 (15-17) 7/19/2007 L0710362-06 mg/kg	Qual
Total Metals									
Aluminum, Total	SB	NC	NC	9200		15000		12000	
Antimony, Total	SB	NC	NC	2.2	U	2.3	U	2.2	U
Arsenic, Total	7.5*	16	13	2.3		3.7		3.2	
Barium, Total	300*	350	350	83		71		100	
Beryllium, Total	0.16	14	7.2	*0.48*		*0.68*		*0.95*	
Cadmium, Total	1*	2.5	2.5	0.44	U	0.47	U	0.44	U
Calcium, Total	SB	NC	NC	2700		5100		14000	
Chromium, Total	10	NC	NC	*25*		*35*		*45*	
Cobalt, Total	30	NC	NC	7		9.2		42	
Copper, Total	25	270	50	*28*		20		*120*	
Iron, Total	2000*	NC	NC	*15000*		*20000*		*20000*	
Lead, Total	200-500	400	63	37		14		98	
Magnesium, Total	SB	NC	NC	5100		6500		10000	
Manganese, Total	SB	2000	1600	230		380		460	
Mercury, Total	0.1	0.81	0.18	0.08	U	0.09	U	0.09	U
Nickel, Total	13	140	30	*16*		*24*		*29*	
Potassium, Total	SB	NC	NC	2800		2200		3500	
Selenium, Total	2	36	3.9	2.2	U	2.3	U	2.2	U
Silver, Total	SB	36	2	0.44	U	0.47	U	0.44	U
Sodium, Total	SB	NC	NC	88	U	410		1100	
Thallium, Total	SB	NC	NC	2.2	U	2.3	U	2.2	U
Vanadium, Total	150*	NC	NC	39		40		39	
Zinc, Total	20	2200	109	*57*		*61*		*750*	

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SB - Site background
* - given value or site background
Bold values exceed unrestricted residential use.
Italicized vallues exceed TAGM criteria

Table 5
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Analyte List - Metals

LOCATION SAMPLING DATE LAB SAMPLE ID Units	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-7 (18-20) 7/19/2007 L0710362-07 mg/kg	Qual	TRC-SB-8 (18-20) 7/19/2007 L0710362-08 mg/kg	Qual	TRC-SB-8 (23-25) 7/19/2007 L0710362-09 mg/kg	Qual
Total Metals									
Aluminum, Total	SB	NC	NC	13000		15000		12000	
Antimony, Total	SB	NC	NC	2.2	U	2.3	U	2.3	U
Arsenic, Total	7.5*	16	13	1.7		3.1		2.5	
Barium, Total	300*	350	350	140		68		82	
Beryllium, Total	0.16	14	7.2	*0.96*		*0.79*		*0.58*	
Cadmium, Total	1*	2.5	2.5	0.44	U	0.46	U	0.47	U
Calcium, Total	SB	NC	NC	6700		1700		2200	
Chromium, Total	10	NC	NC	*36*		*38*		*34*	
Cobalt, Total	30	NC	NC	11		11		8.5	
Copper, Total	25	270	50	*30*		*26*		19	
Iron, Total	2000*	NC	NC	*20000*		*21000*		*18000*	
Lead, Total	200-500	400	63	27		15		26	
Magnesium, Total	SB	NC	NC	8200		7400		5200	
Manganese, Total	SB	2000	1600	240		230		350	
Mercury, Total	0.1	0.81	0.18	**0.22**		0.09	U	0.1	U
Nickel, Total	13	140	30	*25*		*26*		*19*	
Potassium, Total	SB	NC	NC	5100		3100		2000	
Selenium, Total	2	36	3.9	2.2	U	2.3	U	2.3	U
Silver, Total	SB	36	2	0.44	U	0.46	U	0.47	U
Sodium, Total	SB	NC	NC	88	U	93	U	380	
Thallium, Total	SB	NC	NC	2.2	U	2.3	U	2.3	U
Vanadium, Total	150*	NC	NC	44		48		38	
Zinc, Total	20	2200	109	*62*		*57*		*77*	

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandums

Represents restricted residential use prohibits use of single family housing and vegetable gardens. Includes active recreational uses, which are public uses with a reasonable potential for soil contact. Restrictions on the use of groundwater are allowed
U - Concentration less than the minimum laboratory detection limit.
NC - No guidance criteria estabilised for this compound
SB - Site background
* - given value or site background
Bold values exceed unrestricted residential use.
Italicized vallues exceed TAGM criteria

Table 5
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Analyte List - Metals

LOCATION SAMPLING DATE LAB SAMPLE ID Units	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-9 (24-26) 7/19/2007 L0710362-10 mg/kg	Qual	TRC-SB-10 (16-18) 7/19/2007 L0710362-11 mg/kg	Qual	TRC-SB-11 (10-12) 7/19/2007 L0710362-12 mg/kg	Qual
Total Metals									
Aluminum, Total	SB	NC	NC	12000		17000		15000	
Antimony, Total	SB	NC	NC	2.1	U	2.2	U	2.1	U
Arsenic, Total	7.5*	16	13	1.3		0.52		0.42	U
Barium, Total	300*	350	350	150		150		180	
Beryllium, Total	0.16	14	7.2	*1.3*		*2*		*2.3*	
Cadmium, Total	1*	2.5	2.5	0.42	U	0.43	U	0.42	U
Calcium, Total	SB	NC	NC	4400		3400		3100	
Chromium, Total	10	NC	NC	*38*		*31*		*48*	
Cobalt, Total	30	NC	NC	10		15		14	
Copper, Total	25	270	50	*26*		*34*		*36*	
Iron, Total	2000*	NC	NC	*20000*		*32000*		*31000*	
Lead, Total	200-500	400	63	5.1		2.2	U	2.1	U
Magnesium, Total	SB	NC	NC	7800		11000		10000	
Manganese, Total	SB	2000	1600	260		320		340	
Mercury, Total	0.1	0.81	0.18	0.21		0.23		0.29	
Nickel, Total	13	140	30	*20*		*25*		*28*	
Potassium, Total	SB	NC	NC	7300		9200		10000	
Selenium, Total	2	36	3.9	2.1	U	2.2	U	2.1	U
Silver, Total	SB	36	2	0.42	U	0.43	U	0.42	U
Sodium, Total	SB	NC	NC	84	U	86	U	85	U
Thallium, Total	SB	NC	NC	2.1	U	2.2	U	2.1	U
Vanadium, Total	150*	NC	NC	54		79		74	
Zinc, Total	20	2200	109	*48*		*67*		*61*	

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandums

Represents restricted residential use prohibits use of single family housing and vegetable gardens Includes active recreational uses, which are public uses with a reasonable potential for soil contact. Restrictions on the use of groundwater are allowed
U - Concentration less than the minimum laboratory detection limit.
NC - No guidance criteria estabilised for this compound
SB - Site background
* - given value or site background
Bold values exceed unrestricted residential use.
Italicized vallues exceed TAGM criteria

Table 5
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Target Analyte List - Metals

LOCATION SAMPLING DATE LAB SAMPLE ID Units	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-12 (11-12) 7/19/2007 L0710362-13 mg/kg	Qual	TRC-SB-13 (15-17) 7/19/2007 L0710362-15 mg/kg	Qual
Total Metals							
Aluminum, Total	SB	NC	NC	15000		16000	
Antimony, Total	SB	NC	NC	2.1	U	2.2	U
Arsenic, Total	7.5*	16	13	0.43		1.4	
Barium, Total	300*	350	350	220		160	
Beryllium, Total	0.16	14	7.2	*2.2*		*2*	
Cadmium, Total	1*	2.5	2.5	0.42	U	0.43	U
Calcium, Total	SB	NC	NC	3500		2700	
Chromium, Total	10	NC	NC	*27*		*73*	
Cobalt, Total	30	NC	NC	16		12	
Copper, Total	25	270	50	19		23	
Iron, Total	2000*	NC	NC	*25000*		*28000*	
Lead, Total	200-500	400	63	2.1	U	3.1	
Magnesium, Total	SB	NC	NC	11000		10000	
Manganese, Total	SB	2000	1600	260		330	
Mercury, Total	0.1	0.81	0.18	0.09	U	0.08	U
Nickel, Total	13	140	30	*32*		*34*	
Potassium, Total	SB	NC	NC	8800		8500	
Selenium, Total	2	36	3.9	2.1	U	2.2	U
Silver, Total	SB	36	2	0.42	U	0.43	U
Sodium, Total	SB	NC	NC	84	U	86	U
Thallium, Total	SB	NC	NC	2.1	U	2.2	U
Vanadium, Total	150*	NC	NC	51		62	
Zinc, Total	20	2200	109	*56*		*64*	

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Represents restricted residential use prohibits use of single family housing and vegetable gardens. Includes active recreational uses, which are public uses with a reasonable potential for soil contact. Restrictions on the use of groundwater are allowed
U - Concentration less than the minimum laboratory detection limit.
NC - No guidance criteria established for this compound
SB - Site background
* - given value or site background
Bold values exceed unrestricted residential use
Italicized values exceed TAGM criteria

Table 6
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Total Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-A/1 (3-6") 23-JUL-07 L0710597-01 mg/kg	Qual	TRC-SB-B/2 (0-3") 23-JUL-07 L0710597-02 mg/kg	Qual	TRC-SB-C/3 (3-6") 23-JUL-07 L0710597-03 mg/kg	Qual
Metals									
Lead, Total	200-500	400	63	*23000*		300		*7700*	

Sample Results Comparison with New York Restricted and New York Unrestricted Use, Residential Criteria.

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandum s

SB - Criteia is Site Background

* - Sample interval screened through metal sieve to remove all large pieces of lead and debris.

NC = No Criteria

TCLP = Toxicity Characteristic Leaching Procedure

Bold values exceed NY Restricted Use criteria

Shaded values exceed NY Unrestricted Use criteria

Italicized vallues exceed TAGM 500 mg/kg criteria

Table 6
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Total Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-D/4 (0-3") 23-JUL-07 L0710597-04 mg/kg	Qual	TRC-SB-E/5 (6"-1") 23-JUL-07 L0710597-05 mg/kg	Qual	TRC-SB-R/18 (6"-1')* 23-JUL-07 L0710597-18 mg/kg	Qual
Metals									
Lead, Total	200-500	400	63	*3600*		*10000*		*10000*	

Sample Results Comparison with New York Restricted and New York Unrestricted Use, Residential Criteria.

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NC = No Criteria

TCLP = Toxicity Characteristic Leaching Procedure

Bold values exceed NY Restricted Use criteria

Shaded values exceed NY Unrestricted Use criteria

Italicized vallues exceed TAGM 500 mg/kg criteria

Table 6
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Total Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-F/6 (0-3") 23-JUL-07 L0710597-06 mg/kg	Qual	TRC-SB-G/7 (6"-1') 23-JUL-07 L0710597-07 mg/kg	Qual	TRC-SB-H/8 (0-3") 23-JUL-07 L0710597-08 mg/kg	Qual
Metals									
Lead, Total	200-500	400	63	*2300*		*3200*		*5500*	

Sample Results Comparison with New York Restricted and New York Unrestricted Use, Residential Criteria.

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* - Sample interval screened through metal sieve to remove all large pieces of lead and debris.

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TCLP = Toxicity Characteristic Leaching Procedure

Bold values exceed NY Restricted Use criteria

Shaded values exceed NY Unrestricted Use criteria

Italicized vallues exceed TAGM 500 mg/kg criteria

Table 6
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Total Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-I/9 (0-3") 23-JUL-07 L0710597-09 mg/kg	Qual	TRC-SB-J/10 (0-3") 23-JUL-07 L0710597-10 mg/kg	Qual	TRC-SB-P/16 (6"-1') 23-JUL-07 L0710597-16 mg/kg	Qual
Metals Lead, Total	200-500	400	63	170		*2400*		180	

Sample Results Comparison with New York Restricted and New York Unrestricted Use, Residential Criteria.

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NC = No Criteria

TCLP = Toxicity Characteristic Leaching Procedure

Bold values exceed NY Restricted Use criteria

Shaded values exceed NY Unrestricted Use criteria

Italicized vallues exceed TAGM 500 mg/kg criteria

Table 6
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Total Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-K/11 (0-3") 23-JUL-07 L0710597-11 mg/kg	Qual	TRC-SB-Q/17 (0-3")* 23-JUL-07 L0710597-17 mg/kg	Qual	TRC-SB-L/12 (3"-6") 23-JUL-07 L0710597-12 mg/kg	Qual
Metals									
Lead, Total	200-500	400	63	*3400*		*2900*		*5100*	

Sample Results Comparison with New York Restricted and New York Unrestricted Use, Residential Criteria.

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandun

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NC = No Criteria

TCLP = Toxicity Characteristic Leaching Procedure

Bold values exceed NY Restricted Use criteria

Shaded values exceed NY Unrestricted Use criteria

Italicized vallues exceed TAGM 500 mg/kg criteria

Table 6
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
Total Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	TAGM 4046 Rec. Soil Cleanup Obj. mg/kg	Restricted Residential Use Soil Cleanup Objectives mg/kg	Unrestricted Residential Use Soil Cleanup Objectives mg/kg	TRC-SB-M/13 (0-3") 23-JUL-07 L0710597-13 mg/kg	Qual	TRC-SB-N/14 (0-3") 23-JUL-07 L0710597-14 mg/kg	Qual	TRC-SB-O/15 (0-3") 23-JUL-07 L0710597-15 mg/kg	Qual
Metals									
Lead, Total	200-500	400	63	260		81		48	

Sample Results Comparison with New York Restricted and New York Unrestricted Use, Residential Criteria.

TAGM = New York State Department of Environmental Conservation Technical and Administrative Guidance Memorandun

SB - Criteia is Site Background

* - Sample interval screened through metal sieve to remove all large pieces of lead and debris.

NC = No Criteria

TCLP = Toxicity Characteristic Leaching Procedure

Bold values exceed NY Restricted Use criteria

Shaded values exceed NY Unrestricted Use criteria

Italicized vallues exceed TAGM 500 mg/kg criteria

Table 7
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
TCLP Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	Hazardous Waste Criteria mg/l	TRC-SB-A/1 (3-6") 23-JUL-07 L0710597-01 mg/l	Qual	TRC-SB-B/2 (0-3") 23-JUL-07 L0710597-02 mg/l	Qual	TRC-SB-C/3 (3-6") 23-JUL-07 L0710597-03 mg/l	Qual
Metals Lead, TCLP	5	**1900**		**45**		NS	

Hazardous Waste Criteria - EPA 40 CFR Part 261 and 6NYCRR

* - Sample interval screened through metal sieve to remove all large pieces of lead and debris.

mg/l - milligrams per liter
NC = No Criteria
TCLP = Toxicity Characteristic Leaching Procedure
NS - Not sampled
Bold values exceed Hazardous Waste Criteria

Table 7
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
TCLP Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	Hazardous Waste Criteria mg/l	TRC-SB-D/4 (0-3") 23-JUL-07 L0710597-04 mg/l	Qual	TRC-SB-E/5 (6"-1") 23-JUL-07 L0710597-05 mg/l	Qual	TRC-SB-R/18 (6"-1')* 23-JUL-07 L0710597-18 mg/l	Qual
Metals Lead, TCLP	5	NS		**840**		**750**	

Hazardous Waste Criteria - EPA 40 CFR Part 261 and 6NYCRF

* - Sample interval screened through metal sieve to remove all l

mg/l - milligrams per liter
NC = No Criteria
TCLP = Toxicity Characteristic Leaching Procedure
NS - Not sampled
Bold values exceed Hazardous Waste Criteria

Table 7
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
TCLP Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	Hazardous Waste Criteria mg/l	TRC-SB-F/6 (0-3") 23-JUL-07 L0710597-06 mg/l	Qual	TRC-SB-G/7 (6"-1') 23-JUL-07 L0710597-07 mg/l	Qual	TRC-SB-H/8 (0-3") 23-JUL-07 L0710597-08 mg/l	Qual
Metals							
Lead, TCLP	5	NS		NS		99	

Hazardous Waste Criteria - EPA 40 CFR Part 261 and 6NYCRF

* - Sample interval screened through metal sieve to remove all l.

mg/l - milligrams per liter
NC = No Criteria
TCLP = Toxicity Characteristic Leaching Procedure
NS - Not sampled
Bold values exceed Hazardous Waste Criteria

Table 7
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
TCLP Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	Hazardous Waste Criteria mg/l	TRC-SB-I/9 (0-3") 23-JUL-07 L0710597-09 mg/l	Qual	TRC-SB-J/10 (0-3") 23-JUL-07 L0710597-10 mg/l	Qual	TRC-SB-P/16 (6"-1') 23-JUL-07 L0710597-16 mg/l	Qual
Metals							
Lead, TCLP	5	NS		**100**		4.2	

Hazardous Waste Criteria - EPA 40 CFR Part 261 and 6NYCRF

* - Sample interval screened through metal sieve to remove all l

mg/l - milligrams per liter
NC = No Criteria
TCLP = Toxicity Characteristic Leaching Procedure
NS - Not sampled
Bold values exceed Hazardous Waste Criteria

Table 7
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
TCLP Lead

LOCATION SAMPLING DATE LAB SAMPLE ID UNITS	Hazardous Waste Criteria mg/l	TRC-SB-K/11 (0-3") 23-JUL-07 L0710597-11 mg/l	Qual	TRC-SB-Q/17 (0-3")* 23-JUL-07 L0710597-17 mg/l	Qual	TRC-SB-L/12 (3"-6") 23-JUL-07 L0710597-12 mg/l	Qual
Metals Lead, TCLP	5	140		94		NS	

Hazardous Waste Criteria - EPA 40 CFR Part 261 and 6NYCRF

* - Sample interval screened through metal sieve to remove all l

mg/l - milligrams per liter
NC = No Criteria
TCLP = Toxicity Characteristic Leaching Procedure
NS - Not sampled
Bold values exceed Hazardous Waste Criteria

Table 7
Kingsbridge Armory
Bronx, New York
Phase II Environmental Site Assessment
TCLP Lead

LOCATION	Hazardous Waste	TRC-SB-M/13 (0-3")		TRC-SB-N/14 (0-3")		TRC-SB-O/15 (0-3")	
SAMPLING DATE	Criteria	23-JUL-07		23-JUL-07		23-JUL-07	
LAB SAMPLE ID		L0710597-13		L0710597-14		L0710597-15	
UNITS	mg/l	mg/l	Qual	mg/l	Qual	mg/l	Qual
Metals							
Lead, TCLP	5	1.6		0.5	U	NS	

Hazardous Waste Criteria - EPA 40 CFR Part 261 and 6NYCRF

* - Sample interval screened through metal sieve to remove all l

mg/l - milligrams per liter
NC = No Criteria
TCLP = Toxicity Characteristic Leaching Procedure
NS - Not sampled
Bold values exceed Hazardous Waste Criteria

Table 8
Kingsbridge Armory
Bronx, New York
Groundwater Sampling Results
VOCs

LOCATION	TOGS	TRC-MW-1		TRC-MW-2		TRC-MW-3		TRC-MW-5		TRC-BLANK		TRIP BLANK	
SAMPLING DATE	GA	06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07		01-AUG-07	
LAB SAMPLE ID	STANDARD	L0711343-01		L0711343-02		L0711343-03		L0711343-04		L0711343-05		L0711343-06	
Units	ug/l	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual
Volatile Organics by EPA 8260B													
1,1,1,2-Tetrachloroethane	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,1-Trichloroethane	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2,2-Tetrachloroethane	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1,2-Trichloroethane	5	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U
1,1-Dichloroethane	5	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U
1,1-Dichloroethene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,1-Dichloropropene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2,3-Trichlorobenzene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2,3-Trichloropropane	0.04	5	U	5	U	5	U	5	U	5	U	5	U
1,2,4,5-Tetramethylbenzene	5	0.5	U	0.5	U	0.5	U	0.51		0.5	U	0.5	U
1,2,4-Trichlorobenzene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2,4-Trimethylbenzene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dibromo-3-chloropropane	0.04	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dibromoethane	5	2	U	2	U	2	U	2	U	2	U	2	U
1,2-Dichlorobenzene	3	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,2-Dichloroethane	0.6	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
1,2-Dichloropropane	1	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U	1.8	U
1,3,5-Trimethylbenzene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,3-Dichlorobenzene	3	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,3-Dichloropropane	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Dichlorobenzene	3	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
1,4-Diethylbenzene	NC	0.5	U	0.5	U	0.5	U	0.58		0.5	U	0.5	U
2,2-Dichloropropane	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
2-Butanone	50	5	U	5	U	5	U	5	U	5	U	5	U
2-Hexanone	50	5	U	5	U	5	U	5	U	5	U	5	U
4-Ethyltoluene	NC	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
4-Methyl-2-pentanone	NC	5	U	5	U	5	U	5	U	5	U	5	U
Acetone	50	10		5	U	5	U	5	U	5	U	5	U
Benzene	1	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromobenzene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Bromochloromethane	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Bromodichloromethane	50	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Bromoform	50	2	U	2	U	2	U	2	U	2	U	2	U
Bromomethane	5	1	U	1	U	1	U	1	U	1	U	1	U
Carbon disulfide	60	5	U	5	U	5	U	5	U	5	U	5	U
Carbon tetrachloride	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Chlorobenzene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U

Table 8
Kingsbridge Armory
Bronx, New York
Groundwater Sampling Results
VOCs

LOCATION	TOGS	TRC-MW-1		TRC-MW-2		TRC-MW-3		TRC-MW-5		TRC-BLANK		TRIP BLANK	
SAMPLING DATE	GA	06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07		01-AUG-07	
LAB SAMPLE ID	STANDARD	L0711343-01		L0711343-02		L0711343-03		L0711343-04		L0711343-05		L0711343-06	
Units	ug/l	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual
Chloroethane	5	1	U	1	U	1	U	1	U	1	U	1	U
Chloroform	7	0.75	U	0.75	U	0.75	U	0.81		0.75	U	0.75	U
Chloromethane	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
cis-1,2-Dichloroethene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
cis-1,3-Dichloropropene	0.4	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromochloromethane	50	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Dibromomethane	5	5	U	5	U	5	U	5	U	5	U	5	U
Dichlorodifluoromethane	5	5	U	5	U	5	U	5	U	5	U	5	U
Ethylbenzene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Hexachlorobutadiene	0.5	0.6	U	0.63		0.6	U	0.6	U	0.6	U	0.6	U
Isopropylbenzene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Methyl tert butyl ether	10	1	U	1	U	1	U	1	U	1	U	1	U
Methylene chloride	5	5	U	5	U	5	U	5	U	5	U	5	U
n-Butylbenzene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
n-Propylbenzene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Naphthalene	10	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
o-Chlorotoluene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
o-Xylene	5	1	U	1	U	1	U	1	U	1	U	1	U
p-Chlorotoluene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
p-Isopropyltoluene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
p/m-Xylene	5	1	U	1	U	1	U	1	U	1	U	1	U
sec-Butylbenzene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Styrene	5	1	U	1	U	1	U	1	U	1	U	1	U
tert-Butylbenzene	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Tetrachloroethene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Toluene	5	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U
trans-1,2-Dichloroethene	5	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U	0.75	U
trans-1,3-Dichloropropene	0.4	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichloroethene	5	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U	0.5	U
Trichlorofluoromethane	5	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U	2.5	U
Vinyl acetate	NC	5	U	5	U	5	U	5	U	5	U	5	U
Vinyl chloride	2	1	U	1	U	1	U	1	U	1	U	1	U

TOGS GA Standard - New York State Division of Water Technical and Operational Guidance Series: Ambient Water Quality Standards and Guidance Values
All results given in micrograms per liter (ug/L)
U - Concentration less than the minimum detection limit
NC - No guidance criteria established for this compound
Bold values exceed TOGS GA Standard criteria

Table 9
Kingsbridge Armory
Bronx, New York
Groundwater Sampling Results
SVOCs

LOCATION	TOGS	TRC-MW-1		TRC-MW-2		TRC-MW-3		TRC-MW-5		TRC-BLANK	
SAMPLING DATE	GA	06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07	
LAB SAMPLE ID	STANDARD	L0711343-01		L0711343-02		L0711343-03		L0711343-04		L0711343-05	
Units	ug/l	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual
Semivolatile Organics by EPA 8270C											
1,2,4,5-Tetrachlorobenzene	5	20	U	20	U	19	U	19	U	20	U
1,2,4-Trichlorobenzene	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
1,2-Dichlorobenzene	3	4.9	U	5	U	4.8	U	4.8	U	4.9	U
1,3-Dichlorobenzene	3	4.9	U	5	U	4.8	U	4.8	U	4.9	U
1,4-Dichlorobenzene	3	4.9	U	5	U	4.8	U	4.8	U	4.9	U
2,4,5-Trichlorophenol	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
2,4,6-Trichlorophenol	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
2,4-Dichlorophenol	5	9.8	U	10	U	9.6	U	9.6	U	9.9	U
2,4-Dimethylphenol	50	9.8	U	10	U	9.6	U	9.6	U	9.9	U
2,4-Dinitrophenol	10	29	U	30	U	29	U	29	U	30	U
2,4-Dinitrotoluene	5	5.9	U	6	U	5.7	U	5.8	U	5.9	U
2,6-Dinitrotoluene	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
2-Chloronaphthalene	10	5.9	U	6	U	5.7	U	5.8	U	5.9	U
2-Chlorophenol	NC	5.9	U	6	U	5.7	U	5.8	U	5.9	U
2-Methylnaphthalene	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
2-Methylphenol	NC	5.9	U	6	U	5.7	U	5.8	U	5.9	U
2-Nitroaniline	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
2-Nitrophenol	NC	20	U	20	U	19	U	19	U	20	U
3,3'-Dichlorobenzidine	5	49	U	50	U	48	U	48	U	49	U
3-Methylphenol/4-Methylphenol	NC	5.9	U	6	U	5.7	U	5.8	U	5.9	U
3-Nitroaniline	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
4,6-Dinitro-o-cresol	NC	20	U	20	U	19	U	19	U	20	U
4-Bromophenyl phenyl ether	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
4-Chloroaniline	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
4-Chlorophenyl phenyl ether	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
4-Nitroaniline	5	6.8	U	7	U	6.7	U	6.7	U	6.9	U
4-Nitrophenol	NC	9.8	U	10	U	9.6	U	9.6	U	9.9	U
Acenaphthene	20	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Acenaphthylene	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Acetophenone	NC	20	U	20	U	19	U	19	U	20	U
Anthracene	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U

Table 9
Kingsbridge Armory
Bronx, New York
Groundwater Sampling Results
SVOCs

LOCATION	TOGS	TRC-MW-1		TRC-MW-2		TRC-MW-3		TRC-MW-5		TRC-BLANK	
SAMPLING DATE	GA	06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07		06-AUG-07	
LAB SAMPLE ID	STANDARD	L0711343-01		L0711343-02		L0711343-03		L0711343-04		L0711343-05	
Units	ug/l	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual
Benzo(a)anthracene	0.002	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Benzo(a)pyrene	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Benzo(b)fluoranthene	0.002	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Benzo(ghi)perylene	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Benzo(k)fluoranthene	0.002	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Benzoic Acid	NC	49	U	50	U	48	U	48	U	49	U
Benzyl Alcohol	NC	9.8	U	10	U	9.6	U	9.6	U	9.9	U
Biphenyl	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Bis(2-chloroethoxy)methane	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Bis(2-chloroethyl)ether	1	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Bis(2-chloroisopropyl)ether	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Bis(2-Ethylhexyl)phthalate	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Butyl benzyl phthalate	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Carbazole	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Chrysene	0.002	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Di-n-butylphthalate	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Di-n-octylphthalate	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Dibenzo(a,h)anthracene	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Dibenzofuran	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Diethyl phthalate	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Dimethyl phthalate	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Fluoranthene	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Fluorene	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Hexachlorobenzene	0.04	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Hexachlorobutadiene	0.5	9.8	U	10	U	9.6	U	9.6	U	9.9	U
Hexachlorocyclopentadiene	5	29	U	30	U	29	U	29	U	30	U
Hexachloroethane	5	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Indeno(1,2,3-cd)Pyrene	0.002	6.8	U	7	U	6.7	U	6.7	U	6.9	U
Isophorone	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
n-Nitrosodi-n-propylamine	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Naphthalene	10	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Nitrobenzene	0.4	4.9	U	5	U	4.8	U	4.8	U	4.9	U
NitrosoDiPhenylAmine(NDPA)/DPA	NC	15	U	15	U	14	U	14	U	15	U
P-Chloro-M-Cresol	NC	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Pentachlorophenol	1	9.8	U	10	U	9.6	U	9.6	U	9.9	U
Phenanthrene	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U
Phenol	1	6.8	U	7	U	6.7	U	6.7	U	6.9	U
Pyrene	50	4.9	U	5	U	4.8	U	4.8	U	4.9	U

TOGS GA Standard - New York State Division of Water Technical and Operational Guidance Series Ambient Water Quality Standards and Guidance Values
All results given in micrograms per liter (ug/L)
U - Concentration less than the minimum detection limit
NC - No guidance criteria estabilsed for this compound

Table 10
Kingsbridge Armory
Bronx, New York
Groundwater Sampling Results
Total Metals

LOCATION	TOGs	TRC-MW-1		TRC-MW-2		TRC-MW-3		TRC-MW-5		TRC-BLANK	
SAMPLING DATE	GA	08/06/07		08/06/07		08/06/07		08/06/07		08/06/07	
LAB SAMPLE ID	STANDARD	L0711343-01		L0711343-02		L0711343-03		L0711343-04		L0711343-05	
Units	ug/l	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual
Total Metals											
Aluminum, Total	NC	2100		310		2000		700		100	U
Antimony, Total	3	50	U	50	U	50	U	50	U	50	U
Arsenic, Total	25	5	U	5	U	5	U	5	U	5	U
Barium, Total	1000	212		94		135		127		10	U
Beryllium, Total	3	5	U	5	U	5	U	5	U	5	U
Cadmium, Total	5	5	U	5	U	5	U	5	U	5	U
Calcium, Total	NC	160000		180000		230000		180000		100	U
Chromium, Total	50	10		10	U	10	U	10	U	10	U
Cobalt, Total	NC	20	U	20	U	20	U	20	U	20	U
Copper, Total	200	65		10	U	10	U	10	U	10	U
Iron, Total	300	**3200**		**380**		**2700**		**1000**		50	U
Lead, Total	25	10	U	10	U	10	U	10	U	10	U
Magnesium, Total	35000	**43000**		**47000**		**64000**		**44000**		100	U
Manganese, Total	300	**632**		**1120**		**473**		**1440**		10	U
Mercury, Total	0.7	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nickel, Total	100	25	U	25	U	25	U	25	U	25	U
Potassium, Total	NC	14000		24000		31000		21000		2500	U
Selenium, Total	10	10	U	10	U	10	U	10	U	10	U
Silver, Total	50	7	U	7	U	7	U	7	U	7	U
Sodium, Total	20000	**190000**		**390000**		**840000**		**160000**		2000	U
Thallium, Total	0.5	20	U	20	U	20	U	20	U	20	U
Vanadium, Total	NC	10	U	10	U	10	U	10	U	10	U
Zinc, Total	2000	50	U	50	U	50	U	50	U	50	U

TOGS GA Standard - New York State Division of Water Technical and Operational Guidance Series: Ambient Water Quality Standards and Guidance Value
All results given in micrograms per liter (ug/L)
U - Concentration less than the minimum detection limit.
NC - No guidance criteria estabilised for this compound
Bold values exceed TOGS GA Standard criteria

Table 11
Kingsbridge Armory
Bronx, New York
Groundwater Sampling Results
Dissolved Metals

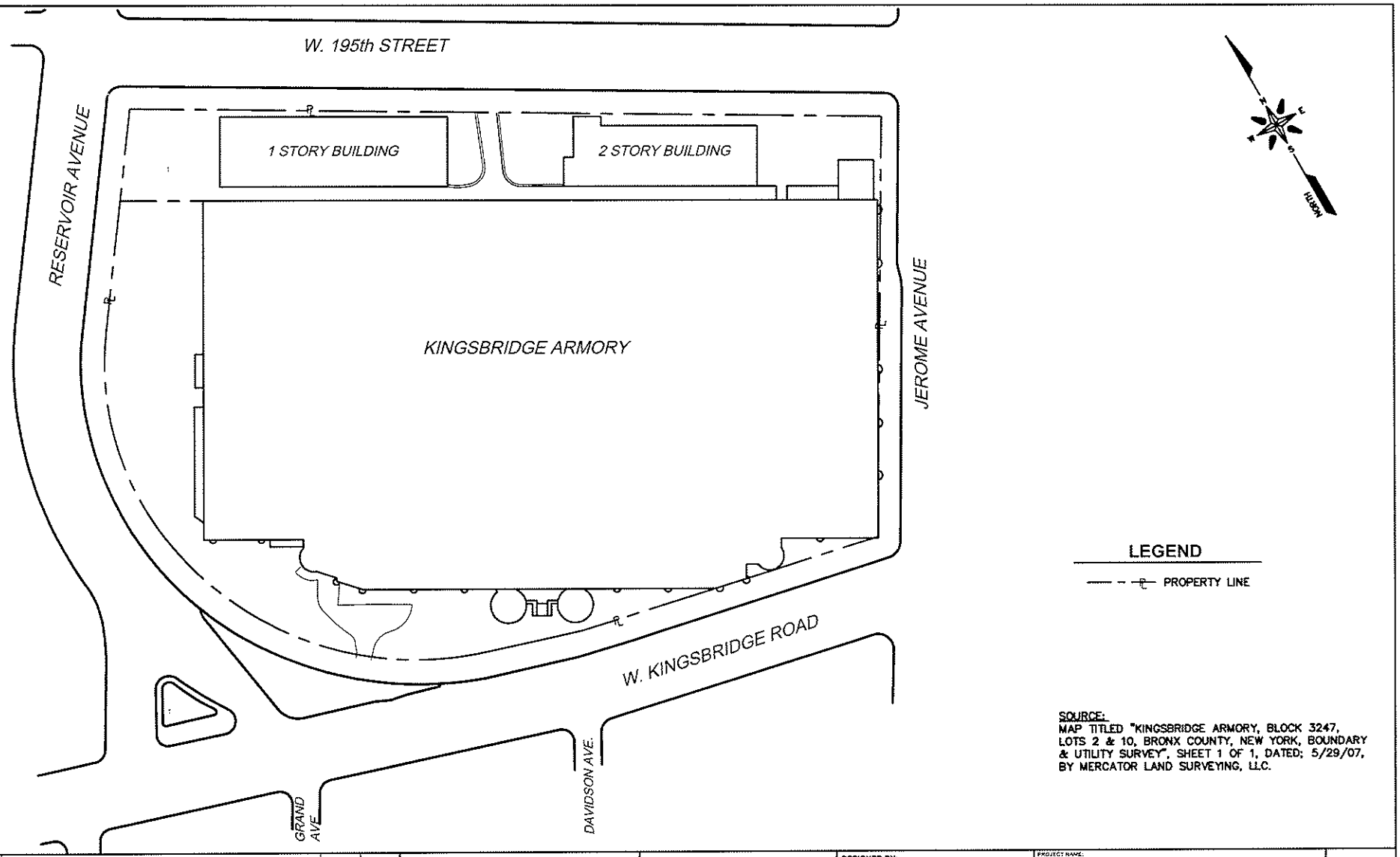
LOCATION	TOGs	TRC-MW-1		TRC-MW-2		TRC-MW-3		TRC-MW-5		TRC-BLANK	
SAMPLING DATE	GA	08/06/07		08/06/07		08/06/07		08/06/07		08/06/07	
LAB SAMPLE ID	STANDARD	L0711343-01		L0711343-02		L0711343-03		L0711343-04		L0711343-05	
Units	ug/l	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual	ug/l	Qual
Dissolved Metals											
Aluminum, Dissolved	NC	100	U	100	U	100	U	100	U	100	U
Antimony, Dissolved	3	50	U	50	U	50	U	50	U	50	U
Arsenic, Dissolved	25	5	U	5	U	5	U	5	U	5	U
Barium, Dissolved	1000	188		87		116		118		10	U
Beryllium, Dissolved	3	5	U	5	U	5	U	5	U	5	U
Cadmium, Dissolved	5	5	U	5	U	5	U	5	U	5	U
Calcium, Dissolved	NC	160000		180000		230000		180000		100	U
Chromium, Dissolved	50	10	U	10	U	10	U	10	U	10	U
Cobalt, Dissolved	NC	20	U	20	U	20	U	20	U	20	U
Copper, Dissolved	200	32		10	U	10	U	10	U	10	U
Iron, Dissolved	300	50	U	50	U	50	U	50	U	50	U
Lead, Dissolved	25	10	U	10	U	10	U	10	U	10	U
Magnesium, Dissolved	35000	40000		45000		61000		42000		100	U
Manganese, Dissolved	300	522		1050		400		1360		10	U
Mercury, Dissolved	0.7	0.2	U	0.2	U	0.2	U	0.2	U	0.2	U
Nickel, Dissolved	100	25	U	25	U	25	U	25	U	25	U
Potassium, Dissolved	NC	12000		22000		28000		20000		2500	U
Selenium, Dissolved	10	10	U	10	U	10	U	10		10	U
Silver, Dissolved	50	7	U	7	U	7	U	7	U	7	U
Sodium, Dissolved	20000	180000		370000		820000		150000		2000	U
Thallium, Dissolved	0.5	20	U	20	U	20	U	20	U	20	U
Vanadium, Dissolved	NC	10	U	10	U	10	U	10	U	10	U
Zinc, Dissolved	2000	50	U	50	U	50	U	50	U	50	U

TOGS GA Standard - New York State Division of Water Technical and Operational Guidance Series: Ambient Water Quality Standards and Guidance Values
All results given in micrograms per liter (ug/L)
U - Concentration less than the minimum detection limit.
NC - No guidance criteria estabilised for this compound
Bold values exceed TOGS GA Standard criteria

Table 12
Groundwater Table Elevation Measurements
Kingsbridge Armory, Bronx, New York

Well	Diameter (inches)	Depth of Well (feet)	Surveyed Top of Casing	Depth to Water*	Water Elevation August 2007
MW-1	2	40	140.28	29.88	**110.40**
MW-2	2	39	139.74	29.32	**110.42**
MW-3	2	38	138.91	26.72	**112.19**
MW-5	2	37	138.91	26.69	**112.22**

Notes:
Elevations refer to the Bronx Borough Datum.
* - Measured from top of well casing.



SOURCE:
MAP TITLED "KINGSBRIDGE ARMORY, BLOCK 3247, LOTS 2 & 10, BRONX COUNTY, NEW YORK, BOUNDARY & UTILITY SURVEY", SHEET 1 OF 1, DATED; 5/29/07, BY MERCATOR LAND SURVEYING, LLC.

REVISIONS NO.	DESCRIPTION	BY	DATE

0 80' 160'
GRAPHIC SCALE
PAPER SIZE: 11" x 17"

TRC
1430 BROADWAY, 10TH FLOOR
NEW YORK, NEW YORK 10018
212-221-7522

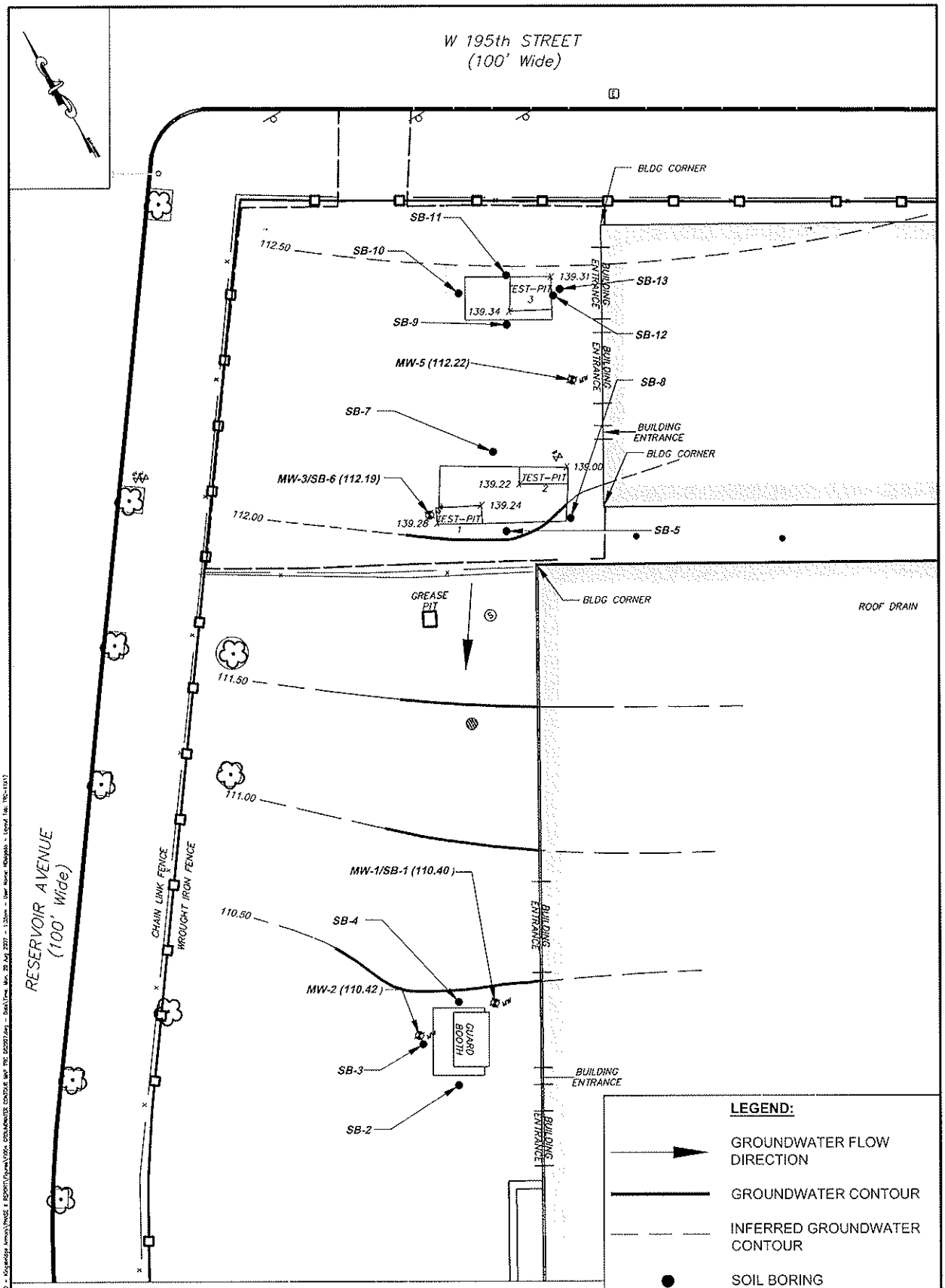
DESIGNED BY:	
DRAWN BY: HD	
CHECKED BY: SM	
DATE: AUGUST 2007	
SCALE: AS SHOWN	
PROJECT NUMBER: 113429.0120.0000	

PROJECT NAME:
KINGSBRIDGE ARMORY
BRONX , NEW YORK

DRAWING TITLE:
SITE LAYOUT

FIGURE
2

Path\Name: I:\Projects\113429 - NYCEDC, Phase I ESA\113429-0120 - Kingsbridge Armory\PHASE II REPORT\Figures\AV0002 SITE LAYOUT 15C (020907.dwg - Dan\Arrow, Fri, 14 Sep 2007 - 12:34pm - User Name: HD\Xplotter - Layout Tab: FIG-2



NOTES:

1. THIS DRAWING IS BASED UPON A COMBINATION OF AERIAL MAPS, FEILD INVESTIGATIONS AND SURVEYS CONDUCTED BY MERCATOR LAND SURVEYING, LLC ENDING ON APRIL 2007 BY AND/OR UNDER THE DIRECT SUPERVISION OF THE UNDERSIGNED SUVEYOR.
2. THE VERTICAL DATUM BASIS IS BOROUGH OF THE BRONX HIGHWAY DATUM WHICH IS 2.608' ABOVE SEA LEVEL AT SANDY HOOK, NEW JERSEY (NGVD29).

0 20 40 FT.

GRAPHIC SCALE: 1"=20'

PAPER SIZE: 17" x 11"

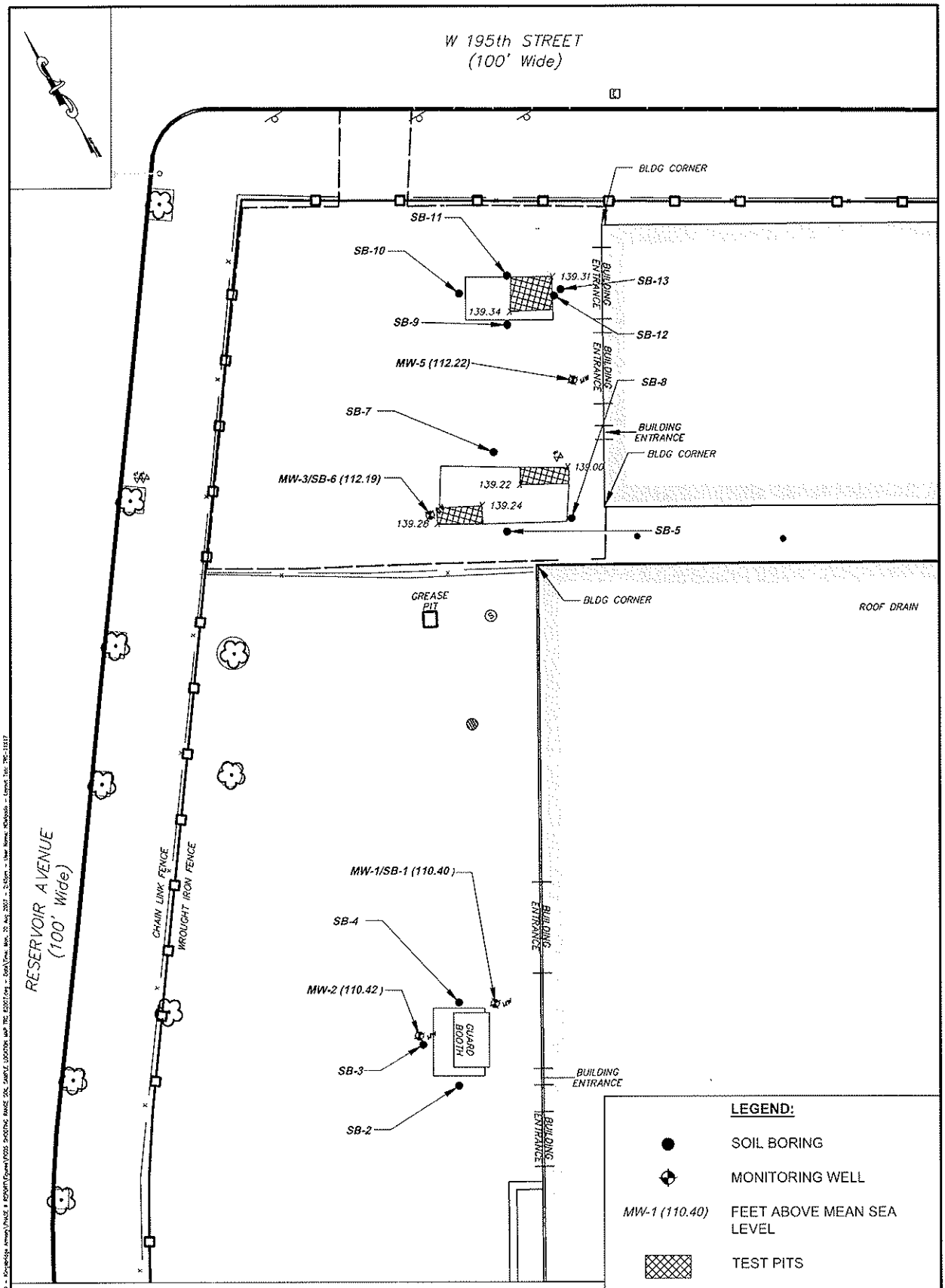
TRC
1430 BROADWAY, 10TH FLOOR
NEW YORK, NEW YORK 10018
212-221-7822

DESIGNED BY:	
DRAWN BY: HD	
CHECKED BY: SM	
DATE: AUGUST 2007	
SCALE: AS SHOWN	
PROJECT NUMBER: 113429.0120.0000	

PROJECT NAME: KINGSBRIDGE ARMORY
BRONX, NEW YORK

DRAWING TITLE: GROUNDWATER CONTOUR MAP
AUGUST 6, 2007

FIGURE 4



NOTES:

1. THIS DRAWING IS BASED UPON A COMBINATION OF AERIAL MAPS, FEILD INVESTIGATIONS AND SURVEYS CONDUCTED BY MERCATOR LAND SURVEYING, LLC ENDING ON APRIL 2007 BY AND/OR UNDER THE DIRECT SUPERVISION OF THE UNDERSIGNED SUVEYOR.
2. THE VERTICAL DATUM BASIS IS BOROUGH OF THE BRONX HIGHWAY DATUM WHICH IS 2.608' ABOVE SEA LEVEL AT SANDY HOOK, NEW JERSEY (NGVD29).

0 20 40 FT.

GRAPHIC SCALE: 1"=20'

PAPER SIZE: 17" x 11"

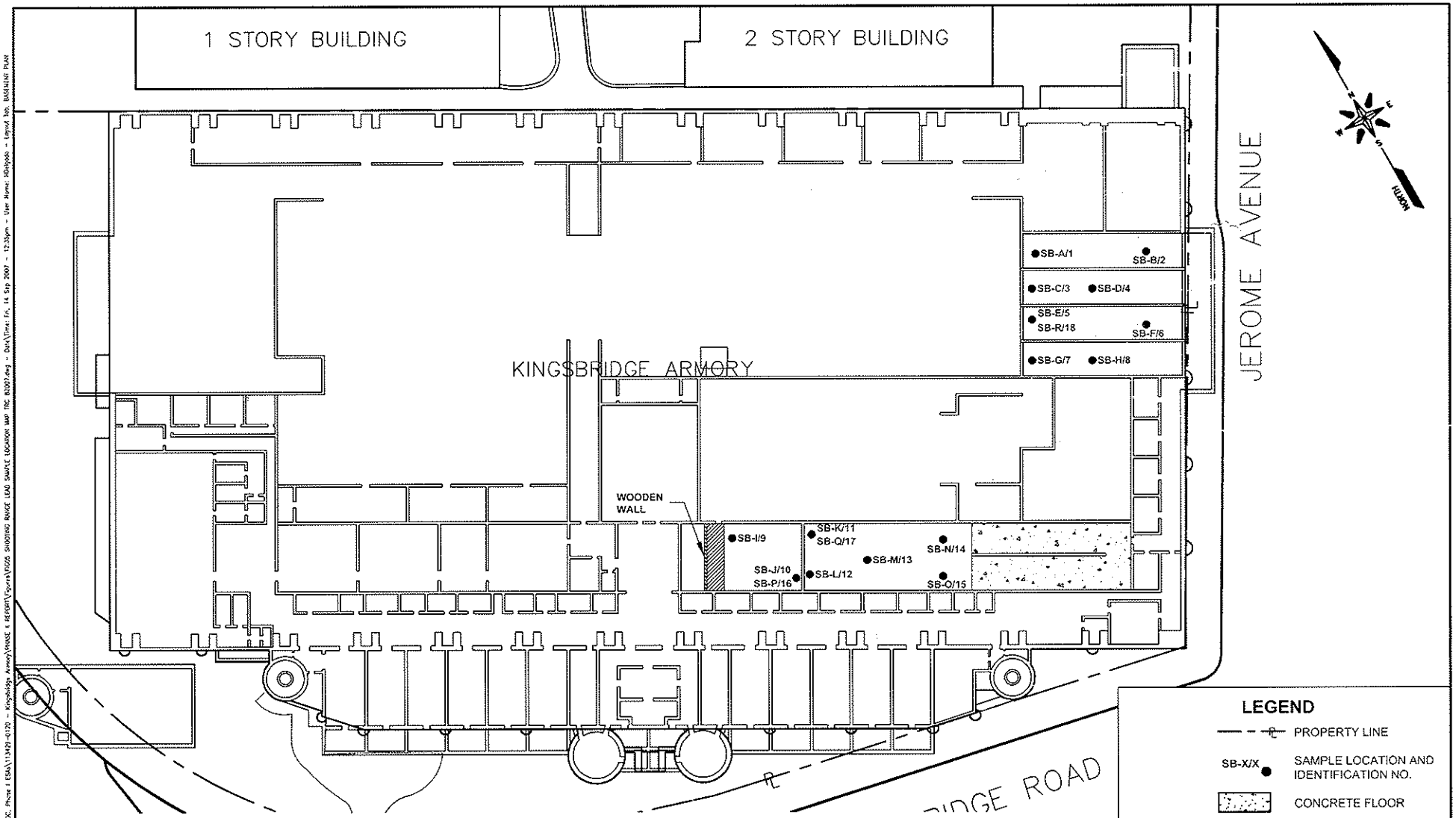
TRC
1430 BROADWAY, 10TH FLOOR
NEW YORK, NEW YORK 10018
212-221-7822

DESIGNED BY:	
DRAWN BY: HD	
CHECKED BY: SM	
DATE: AUGUST 2007	
SCALE: AS SHOWN	
PROJECT NUMBER: 113429.0120.0000	

PROJECT NAME: KINGSBRIDGE ARMORY
BRONX, NEW YORK

DRAWING TITLE: SOIL AND GROUNDWATER SAMPLE LOCATION MAP

FIGURE 3



REVISIONS			
NO.	DESCRIPTION	BY	DATE

0 50' 100'
GRAPHIC SCALE
PAPER SIZE: 11" x 17"

TRC
1430 BROADWAY, 10TH FLOOR
NEW YORK, NEW YORK 10018
212-221-7922

DESIGNED BY:	
DRAWN BY: HD	
CHECKED BY: SM	
DATE: AUGUST 2007	
SCALE: AS SHOWN	
PROJECT NUMBER: 113429.0120.0000	

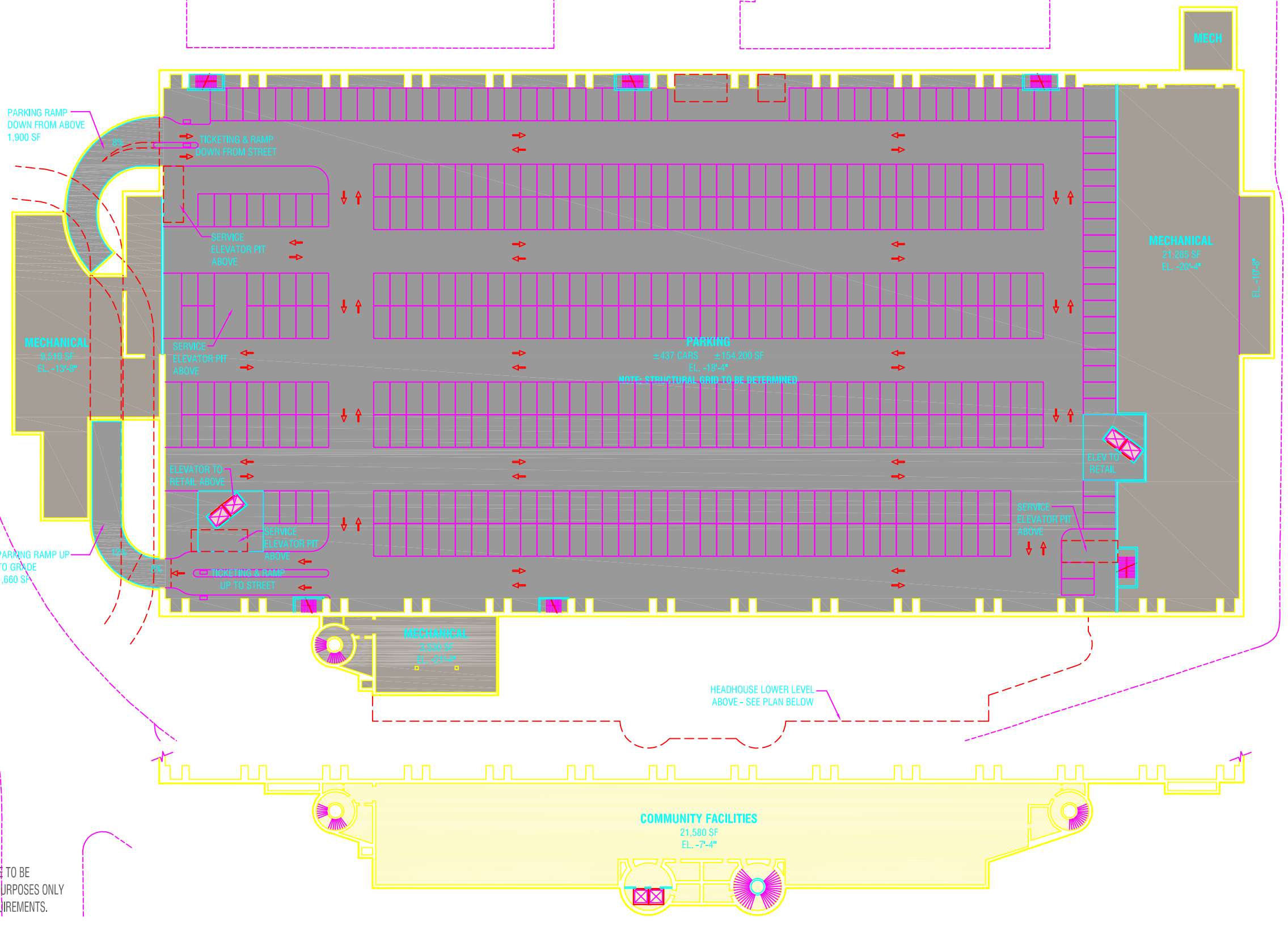
PROJECT NAME: KINGSBRIDGE ARMORY
BRONX , NEW YORK

DRAWING TITLE: SHOOTING RANGE SOIL SAMPLE LOCATION MAP

FIGURE 5

Path\Name: X:\Projects\113429 - NYCEDC, Phase I ESAs\113429-0120 - Kingsbridge Armory\Graphics & REPORT\Figures\Fig05 SHOOTING RANGE LEAD SAMPLE LOCATION MAP TRC 082907.dwg - Date\Time: Fri, 14 Sep 2007 - 12:35pm - User Name: HDalgado - Layout Tab: BASEMENT PLAN

APPENDIX I



NOTE: LOCATIONS OF MECHANICAL SHAFTS ARE TO BE DETERMINED. STAIRS ARE FOR ILLUSTRATIVE PURPOSES ONLY AND SHALL BE REVISED TO MEET EGRESS REQUIREMENTS.

GreenbergFarrow
44 West 28th Street, 16th Floor
New York, NY 10001
t: 212 725 9530 f: 212 725 9552

KINGSBRIDGE ARMORY
Bronx, NY
RELATED
20060809.0

CELLAR LEVEL FLOOR PLAN
SCALE 1:60

2008.07.25

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

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Beverly R. Williams

October 6, 2008

Dean Vanderwarker
Related Retail
60 Columbus Circle
New York, New York 10004

Re: Asbestos Investigation
Kingsbridge Armory
29 West Kingsbridge Road
Bronx, New York
Langan Project No. 5815101

Dear Mr. Vanderwarker:

Langan Engineering and Environmental Services, P.C. (Langan) completed an asbestos investigation of the above referenced building. The purpose of this investigation was to confirm the presence/absence of asbestos containing materials (ACM) within the subject building. The asbestos investigation was performed on September 4, 5, and 8, 2008, by Langan's New York City Department of Environmental Protection Agency (NYCDEP) certified asbestos investigators, Messrs Miroslaw Baran and Sanjay Patel. Langan's certifications are provided in the Attachments.

Site and Building Description

The project site is at the center of a city block bordered by West 195th Street to the north, West Kingsbridge Road to the south, Jerome Avenue to the east, and Reservoir Avenue to the west (Figure 1). Most of the Site is occupied by the landmark Kingsbridge Armory building (Armory), which was constructed on an approximately 200,000-square-foot (sq-ft) footprint between 1912 and 1917 over the abandoned east basin of the Jerome Park Reservoir. The main drill hall at the center of the Armory measures approximately 300 by 600 feet (ft) and is spanned freely by an arched roof framing that rises 110 ft above the drill hall floor. Beneath the drill floor, two cellar levels formerly housed offices, a garage, a gymnasium, rifle and pistol ranges, and rooms for other military functions. The drill hall volume is flanked to the south by a two-story headhouse with a single cellar floor and four towers that contain offices and residential quarters. The eastern portion of the sub-cellar area underlies the Jerome Avenue sidewalk. The sub-cellar of the Armory building is accessible by a ramp that extends from West 195th Street. The Armory is currently owned and operated by the City of New York, and is used for

storage of City property. The heat and hot water to the building was supplied by oil-fired boilers located in the sub-basement.

Observations and Findings

Prior to conducting the field investigation, we reviewed the Environmental Survey Report dated August 24, 2000, prepared by ET Environmental Corporation (ET). The report documented the following building materials to be asbestos containing materials (ACM): Built-up roofing and flashing materials, Roof shingle, Various colors 9-inch square floor tiles, Air-cell and magnesia pipe and pipe joint insulation, Mud-pack pipe joint insulation associated with fiberglass pipe insulation, Window caulking and glazing putty, and Caulking associated with exterior joints, seams and cracks. The wall and ceiling plaster, boiler breeching and insulation, grey floor coating, various ceiling tiles and panels, wallboard and joint compound were documented to be non-ACM.

During Langan's investigation, suspect materials observed in the building were documented, assessed, quantified, and sampled, as necessary. In addition to the materials identified in ET report, Langan observed the following suspect materials which were not addressed: Baseboard Molding Glue, Pyroblock, Pressboard material, Wire wrap insulation, Electric ebony/Transite switch panel, Safety switch backing material, Vibration dumper cloth, Floor joint fill material, Wall panel glue, Mirror glue, Exterior and interior door caulking, Black and brown linoleum, 9-inch square beige floor tile and associated mastic, Black floor tile and associated mastic under plywood, 12-inch square beige floor tile and associated mastic, 12-inch square tan wood design floor tile and associated mastic, 12-inch square terracotta floor tile and associated mastic, 12-inch square dark brown floor tile and associated mastic, Mastic associated with various 9-ich square floor tiles, Pipe insulation debris mixed with plaster, wood and contaminated construction debris.

A total of sixty-six (66) bulk samples of the observed suspect materials were collected during our investigation. Samples were analyzed by AmeriSci laboratory of New York, New York. AmeriSci is accredited by the Environmental Laboratory Accreditation Program (ELAP) and National Voluntary Laboratory Accreditation Program (NVLAP). A copy of laboratory test results, chain-of–custody documentation, and Laboratory's accreditations is provided in the Attachments.

Findings

According to USEPA, a material with an asbestos content greater than one percent by weight is considered as an asbestos-containing material. Consequently, the following materials in the building were identified to be ACM:

- Pipe and Joint Insulation = 9,048 linear feet
- Wire wrap insulation = 26,500 linear feet

- Electric Transite switch panel= 45 square feet
- Floor joint fill material =1,800 square feet
- Wall panel glue = 1,600 square feet
- Mirror glue = 20 square feet
- Various types of floor tiles/mastic (9-inch square beige floor tile and associated mastic, Black floor tile and associated mastic under plywood, 12-inch square tan wood design floor tile and associated mastic, 12-inch square terracotta floor tile and associated mastic, and Mastic associated with various 9-inch square floor tiles) = 28,100 square feet
- Exterior and interior door caulking = 208 Masonry openings
- Original built-up roofing and flashing materials = 50 square feet
- Pipe insulation debris mixed with plaster, wood and other construction debris = 58,700 square feet plus additional 40 cubic yards

The baseboard molding glue, Pyroblock, pressboard material, safety switch backing material, vibration dumper cloth, black and brown linoleum, 12-inch square beige floor tile and associated mastic, 12-inch square dark brown floor tile and associated mastic were identified to be non-ACM. A summary of the asbestos survey findings is provided in attached Table 1.

The ET report documented the built-up roofing material. Apparently, the building was observed to have fairly new built-up roofing. Based on our field observations and review of the Building Department records, it appears that as part of 2002 exterior restoration project, the built-up roofing materials and several windows in the building were replaced. Any roof cuts would void existing warranty, and therefore, the roofs were not sampled during our investigation.

Conclusions and Recommendations

Asbestos-containing materials were identified in friable and non-friable forms in the subject building. All confirmed and presumed ACM in the building that is to be left in place should be managed in good condition under an Operations and Management (O & M) plan. The purpose and objective of the O & M Plan is to maintain the assumed, presumed or known asbestos containing materials in good condition, prevent future release of asbestos fibers, and minimize exposure of all building occupants to asbestos fibers.

Asbestos containing debris from damaged pipe insulation was observed throughout the building. Access to the building should be restricted until the clean-up work is completed.

ACM that would be impacted by planned renovation must be properly removed prior to performing such activities. Refer to Table 1 for the summary of asbestos inspection findings. The removal and disposal of ACM must be performed by a NYS-DOL licensed asbestos handling contractor in accordance with Federal, state, and local regulations. Proper notifications must be filed with the US-EPA, NYS-DOL, NYC-DEP and other regulatory agencies prior to performing such activities.

Abatement design documents should be prepared to identify the locations of ACM removal and specify removal work practices.

As required by the NYS-DOL and NYC-DEP regulations, the abatement project must be monitored by a NYS-DOL certified project monitor. The project monitor oversees contractor's work practices to ensure regulatory compliance and also performs pre, during, and final clearance post abatement air sampling in accordance with the state and city regulations.

In addition to ACM, lead based paint was observed throughout the building. The paint was flaking, cracking, with debris lying on the floor. Apparently, paint stabilization work was performed in the basement and sub-basement. In addition to LBP, suspect PCB/Mercury containing electrical articles were observed throughout the building.

Estimated Remediation Cost

Budgetary estimates for asbestos abatement are provided in Attachments.

The cost for the removal of visually observed ACM/contaminated debris, removal of PCB/Mercury containing electrical articles, and remediation/stabilization of damaged paint in the building is estimated to be approximately **$ 1,350,000,** including preparation of abatement design documents, project monitoring, air sample analysis, and closeout documentation.

We trust that this report will satisfy your requirements. If you have any questions regarding this report, please call me at 201-794-6900.

Sincerely,
Langan Engineering & Environmental Services, P.C.

Vijay Patel
Associate

Cc: Joel Landes– Langan

Attachments: Table 1 - Summary of Asbestos Survey Findings,
Table 2 - Budgetary Estimate for Asbestos Abatement,
Results of Laboratory Analyses and Chain-of-Custody Documentation, and
Langan certifications and Laboratory accreditations

Table 1 – Summary of Asbestos Survey Findings

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Sub-Basement				
Original mud-pack pipe joint insulation associated w/ fiberglass	ACM	3 joints	Fair	—
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Boiler gasket	Non-ACM	—	Good	—
Boiler edge patch material	Non-ACM	—	Good	—
Breeching insulation	Non-ACM	—	Good	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Wall plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Basement				
Original mud-pack pipe joint insulation associated w/ fiberglass	ACM	20 joints	Fair to poor	—
Block and air-cell pipe insulation	ACM	4,350 LF	Poor	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	ACM	39,000 SF	—	The average thickness of the debris layer in majority of the contaminated area was one inch; however, in several locations, thickness of debris layer reached up to two feet.
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	ACM	25 CY	—	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Various types of floor tile and associated mastic	ACM	300 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM.
Electrical wire insulation	ACM	10,000 LF	Unknown	—
Interior door caulking	ACM	3 door openings	Good	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Vibration dumper cloth	Non-ACM	—	Good to fair	—
Electric panel board	Non-ACM	—	Good to fair	—
Pressboard material	Non-ACM	—	Good to fair	—
Cove base and associated mastic	Non-ACM	—	Fair	—
Pyroblock	Non-ACM	—	Unknown	—
Basement Mezzanine				
Block and air-cell pipe insulation	ACM	1,125 LF	Poor	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	ACM	17,500 SF	—	The average thickness of the debris layer in majority of the contaminated area was one inch; however, in several locations, thickness of debris layer reached up to two feet.
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	ACM	10 CY	—	—
Various types of floor tile and associated mastic	ACM	5,500 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. At the eastern section of Basement Mezzanine ACM floor tiles and mastic were observed to be covered with layer of plywood and non-ACM floor tiles.
Electrical wire insulation	ACM	3,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Vibration dumper cloth	Non-ACM	—	Good to fair	—
Electric panel board	Non-ACM	—	Good to fair	—
Cove base and associated mastic	Non-ACM	—	Fair	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Pyroblock	Non-ACM	—	Unknown	—
1st Floor				
Block and air-cell pipe insulation	ACM	120 LF	Fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe open ends were observed.
Pipe insulation debris mixed with plaster on the floor.	ACM	300 SF	—	—
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	ACM	5 CY	—	—
Various types of floor tile and associated mastic	ACM	9,500 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. At one location ACM floor tiles and mastic were observed to be covered with layer of plywood.
Ebony/Transite Electric switch panel	ACM	45 SF	Good to fair	—
Electrical wire insulation	ACM	10,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Vibration dumper cloth	Non-ACM	—	Good to fair	—
Cove base and associated mastic	Non-ACM	—	Fair	—
1st Floor Mezzanine				
Pipe insulation debris mixed with plaster on the floor.	ACM	500 SF	—	—
Various types of floor tile and associated mastic	ACM	1,600 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM.
Electrical wire insulation	ACM	1,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Cove base and associated mastic	Non-ACM	—	Fair	—
2nd Floor				
Block and air-cell pipe insulation	ACM	250 LF	Fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.
Pipe insulation debris on suspended ceiling plaster.	ACM	600 SF	—	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Various types of floor tile and associated mastic	ACM	7,700 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. Hardwood flooring underneath floor tiles was mouldered and was in poor condition. Hardwood flooring was installed on concrete sub-flooring.
Wall panel glue	ACM	1,600 SF	—	—
Mirror glue	ACM	20 SF	—	—
Electrical wire insulation	ACM	2,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Cove base and associated mastic	Non-ACM	—	Fair	—
3rd Floor and 4th Tower Level				
Block and air-cell pipe insulation	ACM	180 LF	Fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.
Pipe insulation debris mixed with plaster on the floor.	ACM	1,000 SF	—	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Various types of floor tile and associated mastic	ACM	3,500 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. Hardwood flooring underneath floor tiles was mouldered and was in poor condition. Hardwood flooring was installed on concrete sub-flooring.
Electrical wire insulation	ACM	500 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Cove base and associated mastic	Non-ACM	—	Fair	—
Roofs and Exteriors				
Original built-up roofing, flashing and mastic materials	ACM	50 SF	Good	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. See Note 1.
Window caulking and glazing putty	ACM	200 masonry window openings	Good to fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000.
Exterior door caulking	ACM	5 masonry door openings	Good	—
Floor joint fill material along perimeter building walls.	ACM	1,800 LF	Good	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Caulking on gable ends and clerestory bands	ACM	12,000 SF of surface impacted by caulking presence	—	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000.
Inaccessible areas				
Block and air-cell pipe insulation	ACM	3,000 LF	Unknown	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. An allowance is provided for the presence of concealed ACM pipe insulation within wall and ceiling cavities.
Pipe insulation debris mixed with plaster on the floor and floor covering.	ACM	1,000 SF	—	An allowance is provided for the presence of concealed ACM pipe insulation within inaccessible building spaces.

Notes:

1. The ET report documented the built-up roofing material. Apparently, the building was observed to have fairly new built-up roofing. Based on our field observations and review of the Building Department records, it appears that as part of 2002 exterior restoration project, the built-up roofing materials and several windows in the building were replaced. Any roof cuts would void existing warranty, and therefore, the roofs were not sampled during our investigation.
2. Any suspect material that is not listed in this report must be presumed ACM until confirmed via laboratory testing.

G:\Data1\5815101\Table 1 .doc

Table 2 – Budgetary Estimate for Asbestos Abatement

TABLE 2
BUDGETARY ESTIMATE FOR HAZMAT ABATEMENT
Kingsbridge Armory
29 West Kingsbridge Road
BRONX, NEW YORK

ACM or Presumed ACM	Quantity of ACM or Presumed ACM	Unit Price	Budgetary Estimate
SUB-BASEMENT			
Original mud-pack pipe joint insulation associated w/ fiberglass	3 Joint	$500	$1,500
BASEMENT			
Original mud-pack pipe joint insulation associated w/ fiberglass	20 joint	$15	$300
Block and air-cell pipe insulation	4,350 LF	$18	$78,300
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	39,000 SF	$5	$195,000
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	25 CY	$300	$7,500
Various types of floor tile and associated mastic	300 SF	$7	$2,100
Electrical wire insulation	10,000 LF	$3	$30,000
Interior door caulking	3 DO	$100	$300
BASEMENT MEZZANINE			
Block and air-cell pipe insulation	1,125 LF	$12	$13,500
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	17,500 SF	$5	$87,500
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	10 CY	$300	$3,000
Various types of floor tile and associated mastic	5,500 SF	$7	$38,500
Electrical wire insulation	3,000 LF	$3	$9,000
FIRST FLOOR			
Block and air-cell pipe insulation	120 LF	$50	$6,000
Pipe insulation debris mixed with plaster on the floor.	300 SF	$10	$3,000
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	5 CY	$300	$1,500
Various types of floor tile and associated mastic	9,500 SF	$7	$66,500
Ebony/Transite Electric switch panel	45 SF	$15	$675
Electrical wire insulation	10,000 LF	$3	$30,000
FIRST FLOOR MEZZANINE			
Pipe insulation debris mixed with plaster on the floor.	500 SF	$5	$2,500
Various types of floor tile and associated mastic	1,600 SF	$7	$11,200
Electrical wire insulation	1,000 LF	$3	$3,000

BUDGETARY ESTIMATE FOR HAZMAT ABATEMENT
Kingsbridge Armory
29 West Kingsbridge Road
BRONX, NEW YORK

ACM or Presumed ACM	Quantity of ACM or Presumed ACM	Unit Price	Budgetary Estimate
SECOND FLOOR			
Block and air-cell pipe insulation	250 LF	$15	$3,750
Pipe insulation debris on suspended ceiling plaster.	600 SF	$5	$3,000
Various types of floor tile and associated mastic	7,700 SF	$7	$53,900
Wall panel glue	1,600 SF	$6	$9,600
Mirror glue	20 SF	$6	$120
Electrical wire insulation	2,000 LF	$3	$6,000
THIRD FLOOR AND FOURTH TOWER LEVEL			
Block and air-cell pipe insulation	180 LF	$30	$5,400
Pipe insulation debris mixed with plaster on the floor.	1,000 SF	$5	$5,000
Various types of floor tile and associated mastic	3,500 SF	$7	$24,500
Electrical wire insulation	500 LF	$3	$1,500
ROOFS AND EXTERIORS			
Original built-up roofing, flashing and mastic materials	50 SF	$50	$2,500
Window caulking and glazing putty	200 WO	$500	$100,000
Exterior door caulking	5 DO	$100	$500
Floor joint fill material along perimeter building walls.	1,800 LF	$5	$9,000
INACCESSIBLE AREAS			
Block and air-cell pipe insulation concealed within wall and ceiling cavities	3,000 LF	$35	$105,000
Pipe insulation debris mixed with plaster on the floor and floor covering.	100 SF	$10	$1,000
TOTAL ASBESTOS ABATEMENT ESTIMATES			**$920,645**
ESTIMATED COST FOR THE MANAGEMENT AND REMEDIATION OF LEAD BASED PAINTED COMPONENTS			**$229,355**
ESTIMATED COST FOR THE REMOVAL OF PCB/MERCURY CONTAINING ELECTRICAL ARTICLES			**$50,000**
ESTIMATED TOTAL FOR PREPARATION OF DESIGN DOCUMENTS, PROJECT MONITORING, AIR SAMPLE ANALYSIS, CLOSURE REPORT, AND SUBMITTAL REVIEW			**$150,000**
ESTIMATED TOTAL FOR THE REMEDIATION OF HAZMAT			**$1,350,000**

Notes:

1. The aforementioned unit prices for asbestos removal are based on the location, size and complexity of the project, and assume that all abatement work will be completed in one phase. These estimates are for budgetary purposes only. Actual removal cost may vary depending upon the market conditions and time of the year ACM are being removed, and work phasing. The estimates include the cost for insurance, overhead, material, labor, disposal permits, OSHA sampling and analysis, and profits. Additionally, the estimated cost is also based on the assumption that union labor wage rate will be used for the workers' and supervisors' wages.

Results of Laboratory/ Chain-of-Custody

LANGAN

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental S
Attn: Vijay Patel
River Drive Center 1

Elmwood Park, NJ 07407

Date Received 09/12/08 **AmeriSci Job #** 208092383
Date Examined 09/15/08 **P.O. #**
ELAP # 11480 **Page** 1 **of** 15
RE: 5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
PYB-1-A 1	208092383-01 **Location:** Pyro Blocks; 1st Floor	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
PYB-1-B 1	208092383-02 **Location:** Pyro Blocks; 1st Floor	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
BG-1-A 2	208092383-03 **Location:** Boiler Gasket; Boiler Room In Sub Basement	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 95 %, Non-fibrous 5 %			
BG-1-B 2	208092383-04 **Location:** Boiler Gasket; Boiler Room In Sub Basement	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Tan/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 75 %, Non-fibrous 25 %			
BEP-1-A 3	208092383-05 **Location:** Boiler Edge Patch Material; Boiler Room In Sub Basement	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 20 %, Non-fibrous 80 %			

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PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BEP-1-B 3	208092383-06 **Location:** Boiler Edge Patch Material; Boiler Room In Sub Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 20 %, Non-fibrous 80 %			
PB-1-A 4	208092383-07 **Location:** Pressboard Material; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 95 %, Non-fibrous 5 %			
PB-1-B 4	208092383-08 **Location:** Pressboard Material; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 95 %, Non-fibrous 5 %			
WI-1-A 5	208092383-09 **Location:** Wire Wrap Insulation; Seating Area	***Yes***	14 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 14.0 % **Other Material:** Non-fibrous 48.9 %			
WI-1-B 5	208092383-10 **Location:** Wire Wrap Insulation; Seating Area		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
EB-1-A 6	208092383-11 **Location:** Electric Panel Board; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
EB-1-B 6	208092383-12 **Location:** Electric Panel Board; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
SSB-1-A 7	208092383-13 **Location:** Safety Switch Backing Material; Seat Level	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10 %, Non-fibrous 90 %			
SSB-1-B 7	208092383-14 **Location:** Safety Switch Backing Material; Seat Level	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10 %, Non-fibrous 90 %			
TR-1-A 8	208092383-15 **Location:** Transite Electrical Panel; 1st Floor	***Yes***	22.2 % (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Cementitious, Bulk Material **Asbestos Types:** Chrysotile 22.2 % **Other Material:** Non-fibrous 77.8 %			
TR-1-B 8	208092383-16 **Location:** Transite Electrical Panel; 1st Floor		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
DB-1-A 9	208092383-17 **Location:** Debris On The Floor Pipe Insulation; Basement	***Yes***	50 % (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 50.0 % **Other Material:** Non-fibrous 50 %			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
DB-1-B	208092383-18		NA/PS
9	**Location:** Debris On The Floor Pipe Insulation; Basement		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
FLEX-1-A	208092383-19	***No***	NAD
10	**Location:** Vibration Damper Cloth; Basement		(by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 90 %, Non-fibrous 10 %			
FLEX-1-B	208092383-20	***No***	NAD
10	**Location:** Vibration Damper Cloth; Basement		(by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 90 %, Non-fibrous 10 %			
MPJ-1-A	208092383-21	***Yes***	44.4 %
11	**Location:** Mud Pack Pipe Joint Attached With Old Fiberglass Pipe Insulation; Center Restroom On South Side- Basement		(by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 44.4 % **Other Material:** Non-fibrous 55.6 %			
FJF-1-A	208092383-22	***Yes***	1.5 %
12	**Location:** Floor Joint Fill Material; Exterior- West Side By Building Wall		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 1.5 % **Other Material:** Non-fibrous 4.9 %			
FJF-1-B	208092383-23		NA/PS
12	**Location:** Floor Joint Fill Material; Exterior- West Side By Building Wall		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WPG-1-A	208092383-24	***Yes***	7.2 %
13	**Location:** Wooden Wall Panel Glue; 2nd Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 7.2 % **Other Material:** Non-fibrous 48.7 %			
WPG-1-B	208092383-25		NA/PS
13	**Location:** Wooden Wall Panel Glue; 2nd Floor		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
WGL-1-A	208092383-26	***No***	NAD
14	**Location:** Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 45.4 %			
WGL-1-B	208092383-27	***No***	NAD
14	**Location:** Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 44.4 %			
MG-1-A	208092383-28	***Yes***	3.2 %
15	**Location:** Mastic Attached With Mirrors On The Wall; 2nd Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.2 % **Other Material:** Non-fibrous 55.1 %			
MG-1-B	208092383-29		NA/PS
15	**Location:** Mastic Attached With Mirrors On The Wall; 2nd Floor		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
IDC-1-A 16	208092383-30 **Location:** Interior Door Caulking; Basement	***Yes***	6.1 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.0 %, Anthophyllite 3.0 % **Other Material:** Fibrous Talc 10 %, Non-fibrous 34 %			
IDC-1-B 16	208092383-31 **Location:** Interior Door Caulking; Basement		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
DC-1-A 17	208092383-32 **Location:** Door Caulking; Exterior	***Yes***	2.4 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 2.4 %, Anthophyllite <1 % pc **Other Material:** Fibrous glass 5 %, Non-fibrous 30.1 %			
DC-1-B 17	208092383-33 **Location:** Door Caulking; Exterior		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
WC-1-A 18	208092383-34 **Location:** Window Caulking; Exterior	***Yes***	3.4 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 1.7 %, Anthophyllite 1.7 % **Other Material:** Fibrous Talc 5 %, Non-fibrous 34.5 %			
WC-1-B 18	208092383-35 **Location:** Window Caulking; Exterior		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BBM-1-A 19	208092383-36L1 **Location:** Covebase; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.5 %			
BBM-1-A 19	208092383-36L2 **Location:** Covebase Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.2 %			
BBM-1-B 19	208092383-37L1 **Location:** Covebase; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 25.9 %			
BBM-1-B 19	208092383-37L2 **Location:** Covebase Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.9 %			
BBM-2-A 20	208092383-38L1 **Location:** 6" Black Covebase; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.8 %			
BBM-2-A 20	208092383-38L2 **Location:** 6" Black Covebase Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.3 %			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BBM-2-B 20	208092383-39L1 **Location:** 6" Black Covebase; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 29.3 %			
BBM-2-B 20	208092383-39L2 **Location:** 6" Black Covebase Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.6 %			
FC-1-A 21	208092383-40 **Location:** Black Linoleum Floor Covering; Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.1 %			
FC-1-B 21	208092383-41 **Location:** Black Linoleum Floor Covering; Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 18 %			
FC-2-A 22	208092383-42 **Location:** Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.3 %			
FC-2-B 22	208092383-43 **Location:** Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.1 %			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-1-A 23	208092383-44 **Location:** 9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side	***Yes***	4 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 4.0 % **Other Material:** Non-fibrous 17.8 %			
FT-1-B 23	208092383-45 **Location:** 9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
FT-2A 24	208092383-46L1 **Location:** L1: 12" Sq. White Floor Tile; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.9 %			
FT-2A 24	208092383-46L2 **Location:** L1: 12" Sq. White Floor Tile Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.5 %			
FT-2A 24	208092383-46L3 **Location:** L2: 12" Sq. Beige Floor Tile; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.4 %			
FT-2A 24	208092383-46L4 **Location:** L2: 12" Sq. Beige Floor Tile Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.6 %			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-2-B 24	208092383-47L1 **Location:** L1: 12" Sq. White Floor Tiles; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.8 %			
FT-2-B 24	208092383-47L2 **Location:** L1: 12" Sq. White Floor Tiles Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.7 %			
FT-2-B 24	208092383-47L3 **Location:** L2: 12" Sq. Beige Floor Tiles; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.4 %			
FT-2-B 24	208092383-47L4 **Location:** L2: 12" Sq. Beige Floor Tiles Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.6 %			
FT-2-C 24	208092383-48L1 **Location:** 12" Sq. Beige Floor Tiles - Only 1 Layer; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.9 %			
FT-2-C 24	208092383-48L2 **Location:** 12" Sq. Beige Floor Tiles Mastic- Only 1 Layer; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7 %			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-3-A	208092383-49L1	***Yes***	6.9 %
25	**Location:** Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 6.9 % **Other Material:** Non-fibrous 34.6 %			
FT-3-A	208092383-49L2	***No***	NAD
25	**Location:** Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.8 %			
FT-3-B	208092383-50L1		NA/PS
25	**Location:** Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
FT-3-B	208092383-50L2	***Yes***	Trace (<0.25 % pc)
25	**Location:** Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2		(ELAP 198.6; 400pc) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile <0.25 % pc **Other Material:** Non-fibrous 9.8 %			
FT-4-A	208092383-51L1	***Yes***	5.5 %
26	**Location:** 12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 5.5 % **Other Material:** Non-fibrous 23.5 %			
FT-4-A	208092383-51L2	***No***	NAD
26	**Location:** 12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.5 %			

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-4-B 26	208092383-52L1 **Location:** 12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine		NA/PS
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
FT-4-B 26	208092383-52L2 **Location:** 12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Brown/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.8 %		
FT-5-A 27	208092383-53L1 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor	***Yes***	3.7 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Red, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.7 % **Other Material:** Non-fibrous 25.7 %		
FT-5-A 27	208092383-53L2 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.1 %		
FT-5-B 27	208092383-54L1 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor		NA/PS
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
FT-5-B 27	208092383-54L2 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 29.1 %		

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Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-6-A 28	208092383-55L1 **Location:** 12" Sq. Dark Brown Floor Tile; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.5 %			
FT-6-A 28	208092383-55L2 **Location:** 12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.8 %			
FT-6-B 28	208092383-56L1 **Location:** 12" Sq. Dark Brown Floor Tile; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.3 %			
FT-6-B 28	208092383-56L2 **Location:** 12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 12.7 %			
MA-1-A 29	208092383-57 **Location:** Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.7 %			
MA-1-B 29	208092383-58 **Location:** Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 24.8 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MA-2-A	208092383-59	***No***	NAD
30	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.7 %			
MA-2-B	208092383-60	***No***	NAD
30	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.8 %			
MA-3-A	208092383-61	***No***	NAD
31	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.7 %			
MA-3-B	208092383-62	***No***	NAD
31	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.9 %			
MA-4-A	208092383-63	***No***	NAD
32	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.4 %			
MA-4-B	208092383-64	***No***	NAD
32	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.7 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MA-5-A	208092383-65	***No***	NAD
33	**Location:** Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 6.8 %			
MA-5-B	208092383-66	***No***	NAD
33	**Location:** Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 4.3 %			

Reporting Notes:

Analyzed by: John P. Koubiadis

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200546-0), ELAP PLM Method 198.1 for NY friable samples or 198.6 for NOB samples (NY ELAP Lab ID11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile,FR 59,146,38970,8/1/94). National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab. This PLM report relates ONLY to the items tested. AIHA Lab # 102843.

Reviewed By: _____

_____END OF REPORT_____

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	PYB-1-A	1	----	----	----	----	NAD	NA
Location:	Pyro Blocks; 1st Floor							
02	PYB-1-B	1	----	----	----	----	NAD	NA
Location:	Pyro Blocks; 1st Floor							
03	BG-1-A	2	----	----	----	----	NAD	NA
Location:	Boiler Gasket; Boiler Room In Sub Basement							
04	BG-1-B	2	----	----	----	----	NAD	NA
Location:	Boiler Gasket; Boiler Room In Sub Basement							
05	BEP-1-A	3	----	----	----	----	NAD	NA
Location:	Boiler Edge Patch Material; Boiler Room In Sub Basement							
06	BEP-1-B	3	----	----	----	----	NAD	NA
Location:	Boiler Edge Patch Material; Boiler Room In Sub Basement							
07	PB-1-A	4	----	----	----	----	NAD	NA
Location:	Pressboard Material; Basement							
08	PB-1-B	4	----	----	----	----	NAD	NA
Location:	Pressboard Material; Basement							
09	WI-1-A	5	1.276	19.2	17.9	48.9	Chrysotile 14.0	NA
Location:	Wire Wrap Insulation; Seating Area							
10	WI-1-B	5	1.123	21.8	16.9	61.3	NA/PS	NA
Location:	Wire Wrap Insulation; Seating Area							
11	EB-1-A	6	----	----	----	----	NAD	NA
Location:	Electric Panel Board; Basement							
12	EB-1-B	6	----	----	----	----	NAD	NA
Location:	Electric Panel Board; Basement							
13	SSB-1-A	7	----	----	----	----	NAD	NA
Location:	Safety Switch Backing Material; Seat Level							
14	SSB-1-B	7	----	----	----	----	NAD	NA
Location:	Safety Switch Backing Material; Seat Level							
15	TR-1-A	8	----	----	----	----	Chrysotile 22.2	NA
Location:	Transite Electrical Panel; 1st Floor							
16	TR-1-B	8	----	----	----	----	NA/PS	NA
Location:	Transite Electrical Panel; 1st Floor							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	DB-1-A	9	----	----	----	----	Chrysotile 50.0	NA
Location:	Debris On The Floor Pipe Insulation; Basement							
18	DB-1-B	9	----	----	----	----	NA/PS	NA
Location:	Debris On The Floor Pipe Insulation; Basement							
19	FLEX-1-A	10	----	----	----	----	NAD	NA
Location:	Vibration Damper Cloth; Basement							
20	FLEX-1-B	10	----	----	----	----	NAD	NA
Location:	Vibration Damper Cloth; Basement							
21	MPJ-1-A	11	----	----	----	----	Chrysotile 44.4	NA
Location:	Mud Pack Pipe Joint Attached With Old Fiberglass Pipe Insulation; Center Restroom On South Side- Basement							
22	FJF-1-A	12	0.172	90.1	3.5	4.9	Chrysotile 1.5	NA
Location:	Floor Joint Fill Material; Exterior- West Side By Building Wall							
23	FJF-1-B	12	0.382	75.9	3.9	20.2	NA/PS	NA
Location:	Floor Joint Fill Material; Exterior- West Side By Building Wall							
24	WPG-1-A	13	1.298	34.9	9.2	48.7	Chrysotile 7.2	NA
Location:	Wooden Wall Panel Glue; 2nd Floor							
25	WPG-1-B	13	0.565	32.2	27.4	40.4	NA/PS	NA
Location:	Wooden Wall Panel Glue; 2nd Floor							
26	WGL-1-A	14	0.425	52.5	2.1	45.4	NAD	NAD
Location:	Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine							
27	WGL-1-B	14	0.432	53.7	1.9	44.4	NAD	NAD
Location:	Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine							
28	MG-1-A	15	0.504	25.2	16.5	55.1	Chrysotile 3.2	NA
Location:	Mastic Attached With Mirrors On The Wall; 2nd Floor							
29	MG-1-B	15	0.361	27.4	17.2	55.4	NA/PS	NA
Location:	Mastic Attached With Mirrors On The Wall; 2nd Floor							
30	IDC-1-A	16	0.795	27.2	22.8	44.0	Chrysotile 3.0	NA
Location:	Interior Door Caulking; Basement						Anthophyllite 3.0	
31	IDC-1-B	16	0.507	28.8	22.1	49.1	NA/PS	NA
Location:	Interior Door Caulking; Basement							
32	DC-1-A	17	0.451	53.4	9.1	35.1	Chrysotile 2.4	NA
Location:	Door Caulking; Exterior						Anthophyllite <1	

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	DC-1-B	17	0.803	38.1	10.6	51.3	NA/PS	NA
Location:	Door Caulking; Exterior							
34	WC-1-A	18	0.198	41.9	15.2	39.5	Chrysotile 1.7	NA
Location:	Window Caulking; Exterior						Anthophyllite 1.7	
35	WC-1-B	18	0.484	39.3	12.0	48.8	NA/PS	NA
Location:	Window Caulking; Exterior							
36L1	BBM-1-A	19	0.364	40.9	31.6	27.5	NAD	NAD
Location:	Covebase; Basement- Mezzanine							
36L2	BBM-1-A	19	0.416	30.3	69.5	0.2	NAD	NAD
Location:	Covebase Mastic; Basement- Mezzanine							
37L1	BBM-1-B	19	0.482	42.3	31.7	25.9	NAD	NAD
Location:	Covebase; Basement- Mezzanine							
37L2	BBM-1-B	19	0.435	31.0	68.0	0.9	NAD	NAD
Location:	Covebase Mastic; Basement- Mezzanine							
38L1	BBM-2-A	20	0.363	37.2	51.0	11.8	NAD	NAD
Location:	6" Black Covebase; 2nd Floor							
38L2	BBM-2-A	20	0.312	28.8	70.8	0.3	NAD	NAD
Location:	6" Black Covebase Mastic; 2nd Floor							
39L1	BBM-2-B	20	0.559	38.3	32.4	29.3	NAD	NAD
Location:	6" Black Covebase; 2nd Floor							
39L2	BBM-2-B	20	0.344	27.3	72.1	0.6	NAD	NAD
Location:	6" Black Covebase Mastic; 2nd Floor							
40	FC-1-A	21	0.747	71.8	9.1	19.1	NAD	NAD
Location:	Black Linoleum Floor Covering; Basement Mezzanine							
41	FC-1-B	21	0.668	71.1	10.9	18.0	NAD	NAD
Location:	Black Linoleum Floor Covering; Basement Mezzanine							
42	FC-2-A	22	0.719	72.9	10.8	16.3	NAD	NAD
Location:	Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine							
43	FC-2-B	22	0.669	72.9	10.9	16.1	NAD	NAD
Location:	Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine							
44	FT-1-A	23	0.239	20.1	58.2	17.8	Chrysotile 4.0	NA
Location:	9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
45	FT-1-B	23	0.604	20.9	47.5	31.6	NA/PS	NA
Location:	9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side							
46L1	FT-2A	24	0.999	11.5	87.6	0.9	NAD	NAD
Location:	L1: 12" Sq. White Floor Tile; Basement- Mezzanine							
46L2	FT-2A	24	0.067	22.4	76.1	1.5	NAD	NAD
Location:	L1: 12" Sq. White Floor Tile Mastic; Basement- Mezzanine							
46L3	FT-2A	24	0.327	21.7	71.9	6.4	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tile; Basement- Mezzanine							
46L4	FT-2A	24	0.393	25.7	68.7	5.6	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tile Mastic; Basement- Mezzanine							
47L1	FT-2-B	24	0.621	11.0	87.3	1.8	NAD	NAD
Location:	L1: 12" Sq. White Floor Tiles; Basement- Mezzanine							
47L2	FT-2-B	24	0.112	22.3	75.0	2.7	NAD	NAD
Location:	L1: 12" Sq. White Floor Tiles Mastic; Basement- Mezzanine							
47L3	FT-2-B	24	0.667	22.6	73.9	3.4	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tiles; Basement- Mezzanine							
47L4	FT-2-B	24	0.213	39.9	54.5	5.6	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tiles Mastic; Basement- Mezzanine							
48L1	FT-2-C	24	0.549	21.1	71.9	6.9	NAD	NAD
Location:	12" Sq. Beige Floor Tiles - Only 1 Layer; Basement- Mezzanine							
48L2	FT-2-C	24	0.270	65.6	27.4	7.0	NAD	NAD
Location:	12" Sq. Beige Floor Tiles Mastic- Only 1 Layer; Basement- Mezzanine							
49L1	FT-3-A		0.337	27.6	30.9	41.5	Chrysotile 6.9	NA
Location:	Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2							
49L2	FT-3-A	25	0.167	80.8	8.4	10.8	NAD	NAD
Location:	Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2							
50L1	FT-3-B		0.414	28.7	27.1	44.2	NA	NA
Location:	Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2							
50L2	FT-3-B	25	0.214	81.8	8.4	7.8	Chrysotile <0.25	Chrysotile 2.0
Location:	Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2							
51L1	FT-4-A	26	1.003	26.3	44.7	23.5	Chrysotile 5.5	NA
Location:	12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
51L2	FT-4-A	26	0.215	54.4	26.0	19.5	NAD	NAD
Location:	12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine							
52L1	FT-4-B	26	0.590	26.8	44.7	28.5	NA/PS	NA
Location:	12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine							
52L2	FT-4-B	26	0.177	58.8	21.5	19.8	NAD	NAD
Location:	12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine							
53L1	FT-5-A	27	0.562	23.7	47.0	25.7	Chrysotile 3.7	NA/PS
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor							
53L2	FT-5-A	27	0.059	39.0	33.9	21.7	NAD	Chrysotile 5.4
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor							
54L1	FT-5-B	27	0.266	24.4	54.5	21.1	NA/PS	NA/PS
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor							
54L2	FT-5-B	27	0.086	50.0	20.9	29.1	NAD	NA/PS
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor							
55L1	FT-6-A	28	0.617	24.8	63.7	11.4	NAD	Chrysotile Trace
Location:	12" Sq. Dark Brown Floor Tile; 2nd Floor							
55L2	FT-6-A	28	0.167	62.3	18.0	19.6	NAD	Chrysotile <1.0
Location:	12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor							
56L1	FT-6-B	28	0.586	24.1	64.7	11.3	NAD	NAD
Location:	12" Sq. Dark Brown Floor Tile; 2nd Floor							
56L2	FT-6-B	28	0.063	57.1	30.2	12.7	NAD	NAD
Location:	12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor							
57	MA-1-A	29	0.093	63.4	26.9	8.2	NAD	Chrysotile 1.5
Location:	Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine							
58	MA-1-B	29	0.105	50.5	24.8	24.8	NAD	NA/PS
Location:	Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine							
59	MA-2-A	30	0.197	84.8	4.6	10.6	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor							
60	MA-2-B	30	0.451	84.0	4.2	11.7	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor							
61	MA-3-A	31	0.291	91.4	5.8	2.6	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
62	MA-3-B	31	0.212	93.4	4.7	1.8	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor							
63	MA-4-A	32	0.166	84.3	4.2	11.3	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor							
64	MA-4-B	32	0.140	85.0	4.3	10.7	NAD	NAD
Location:	Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor							
65	MA-5-A	33	0.059	84.7	8.5	5.1	NAD	Chrysotile 1.7
Location:	Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine							
66	MA-5-B	33	0.138	88.4	7.2	4.3	NAD	NA/PS
Location:	Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine							

Analyzed by: Aleksandr Barengolts; Date Analyzed 9/15/2008

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by EPA 600/M4-82-020 per 40 CFR or ELAP 198.1 for New York friable samples or ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (not covered by NVLAP Bulk accreditation); or ELAP 198.4 for New York samples; NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses); AIHA Lab # 102843, NVLAP Lab Code 200546-0, NYSDOH ELAP LAB ID 11480.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

Reviewed By:

Langan
Engineering and Environmental Services

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555 Long Wharf Drive
New Haven, CT 06511-6107
Phone: 203-562-5771
Fax: 203-789-6142

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Kingsbridge Armory	Project. No.:	5815101
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel
Site Location:	Bronx, New York	Phone No:	(201) 794-6900
Sampled By:	M. Baran/S. Patel	License #:	103281
Company:	LANGAN		72hrs TAT

ANALYSIS REQUESTED: Asbestos: **XX** Lead:
BULK: **XX**

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
PYB-1-A	pyro-bloeks	1st Floor	9/4,5 &8/08	X				
PYB-1-B	↓	↓	↓	X				
BG-1-A	Boiler Gasket	Boiler room in sub basement		X	20809238 3 -			
BG-1-B	↓	↓		X				
BEP-1-A	Boiler edge Patch materials			X				
BEP-1-B	↓	↓		X				
PB-1-A	Pressboard material	Basement		X				
PB-1-B	↓	↓		X				
WI-1-A	Wire wrap insulation	seating area		X				
WI-1-B	↓	↓	↓	X				

Total No. of Samples: 10
Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

☒ River Drive Center I
Elmwood Park, NJ 07407
Phone: 201-794-6900
Fax: 201-794-7501

☐ 90 West Street
New York, NY 10006-1039
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Fax: 212-964-7885

☐ Georgetown Crossing
3655 Route 202, Ste 225
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Fax: 215-348-7125

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Fax: 215-864-0671

☐ Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511-6107
Phone: 203-562-5771
Fax: 203-789-6142

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
EB-1-A	Electric panel board	Basement	9/4,5 &8/08	X				
EB-1-B	↓	↓	↓	X				
SSB-1-A	Safety switch backing material	seat level		X	20809283-			
SSB-1-B	↓	↓	↓	X				
TR-1-A	Transite electrical panel	1st Floor		X				
TR-1-B	↓	↓	↓	X				
DB-1-A	Debris on the floor Pipe insulation	Basement		X				
DB-1-B	↓	↓	↓	X				
FLEX-1-A	Vibration damper cloth	Basement		X				
FLEX-1-B	↓	↓	↓	X				

Total No. of Samples: 10

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

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CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

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☐ Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511-6107
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Fax: 203-789-6142

Project Name:	Kingsbridge Armory	Project. No.:	5815101
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel
Site Location:	Bronx, New York	Phone No:	(201) 794-6900
Sampled By:	M. Baran/S. Patel	License #:	103281
Company:	LANGAN		72hrs TAT

Sample ID Number	Description of Sample	Location	Sampling Date	ANALYSIS REQUESTED: Asbestos: XX BULK: XX PLM	PLM-NOB	TEM	AAS	Lead: TCLP
					208092383-			
MPJ-1-A	Mudpack pipe joint attached with old fiberglass pipe insulation	Center restroom on southside - Basement	9/4,5 &8/08	X				
FJF-1-A	Floor joint fill material	Exterior - Westside by building wall		X	X	X		
FJF-1-B	↓	↓		X	X	X		
WPG-1-A	Wooden wall panel glue	2nd floor			X	X		
WPG-1-B	↓	↓			X	X		
WGL-1-A	Glue attached with cork wall tiles	1st Floor Mezza-nine			X	X		
WGL-1-B	↓	↓			X	X		
MG-1-A	Mastic attached with mirrors on the wall	2nd Floor			X	X		
MG-1-B	↓	↓			X	X		
/	/	/						

Total No. of Samples: 09

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	
Company: LANGAN		Company: 1057

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

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Fax: 203-789-6142

				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
IDC-1-A	Interior door caulking	Basement	9/4,5 &8/08		X	X		
IDC-1-B	↓	↓	↓		X	X		
DC-1-A	Door Caulking	Exterior			X	X		
DC-1-B	↓	↓			X	X		
WC-1-A	Window Caulking				X	X		
WC-1-B	↓	↓			X	X		
BBM-1-A	Cove base and mastic	Basement - Mezzanine			X	X		
BBM-1-B	↓	↓			X	X		
BBM-2-A	6" black cove base and mastic	2nd floor			X	X		
BBM-2-B	↓	↓	↓		X	X		

2080923833

Total No. of Samples: 10

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

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Phone: 203-562-5771
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				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
FC-1-A	Black linoleum floor covering	Basement Mezzanine	9/4,5 &8/08		X	X		
FC-1-B	↓	↓	↓		X	X		
FC-2-A	Brown linoleum floor covering	Middle stair room Basement Mezzaine	↓		X	X		
FC-2-A	↓	↓	↓		X	X		
FT-1-A	9"sq. Beige floor tiles/ NO mastic	Basement - North side	↓		X	X		
FT-1-B	↓	↓	↓		X	X		
FT-2-A	L1: 12"sq. white floor tiles and mastic	Basement - Mezzanine	↓		X	X		
	L2: 12"sq. beige floor tiles and mastic	↓	↓		X	X		
FT-2-B	↓	↓	↓		X	X		
FT-2-C	12"sq. beige floor tiles and mastic - Only 1 layer	↓	↓		X	X		

2080923833

Total No. of Samples: 09

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12 1037
Fedex Delivery	TIME:	
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

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CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Kingsbridge Armory	Project. No.:	5815101
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel
Site Location:	Bronx, New York	Phone No:	(201) 794-6900
Sampled By:	M. Baran/S. Patel	License #:	103281
Company:	LANGAN		72hrs TAT

Sample ID Number	Description of Sample	Location	Sampling Date	ANALYSIS REQUESTED: Asbestos: XX BULK: XX PLM	PLM-NOB	TEM	Lead: AAS	TCLP
FT-3-A	Black floor tiles and mastic/felt paper	Basement-Mezzanine under Plywood & FT-2	9/4,5 &8/08		X	X		
FT-3-B	↓	↓	↓		X	X		
FT-4-A	12" sq. tan wood design floor tiles and mastic	1st floor-Mezzanine			X	X	2080923	83
FT-4-B	↓	↓			X	X		
FT-5-A	12" sq. terra cotta red with brown speckles FT and mastic	2nd Floor			X	X		
FT-5-B	↓	↓			X	X		
FT-6-A	12" sq. dark brown floor tiles and mastic	2nd Floor			X	X		
FT-6-B	↓	↓			X	X		
MA-1-A	Mastic attached with 9" sq. red floor tiles (No FT)	Middle stair room Basement-Mezzanine			X	X		
MA-1-B	↓	↓	↓		X	X		

Total No. of Samples: 10

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	0937
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

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New Haven, CT 06511-6107
Phone: 203-562-5771
Fax: 203-789-6142

				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
MA-2-A	Mastic/Felt paper attached with 9" sq. brown floor tiles,	1st Floor	9/4,5 &8/08		X	X		
MA-2-B	↓	↓	↓		X	X		
MA-3-A	Mastic/Felt paper attached with 9"sq. black floor tiles	1st Floor			X	X		
MA-3-B	↓	↓	↓		X	X		
MA-4-A	Mastic/Felt attached with 9"sq. blue floor tiles	1st Floor			X	X		
MA-4-B	↓	↓	↓		X	X		
MA-5-A	Mastic attached with 9"sq. wood design floor tiles	1st Floor-Mezzanine			X	X		
MA-5-B	↓	↓	↓		X	X		

2080923837

Total No. of Samples: 08

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan Certifications/ Laboratory Accreditations

LANGAN

NEW YORK STATE - DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH
LICENSE AND CERTIFICATE UNIT
STATE CAMPUS BUILDING 12
ALBANY, NY 12240

ASBESTOS HANDLING LICENSE

Langan Engineering And Environmental Services, Inc.
River Drive Center One
619 River Drive
Elmwood Park, NJ 07407

FILE NUMBER: 99-0273
LICENSE NUMBER: 29702
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 06/10/2008
EXPIRATION DATE: 06/30/2009

Duly Authorized Representative – Vijay Patel

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Maureen A. Cox, Director
FOR THE COMMISSIONER OF LABOR

SH 432 (4-07)

United States Environmental Protection Agency

This is to certify that

Langan Engineering & Environmental Services, Inc.

619 River Drive Center 1, Elmwood Park, New Jersey 07407

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402(a)(1), and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226.

In the Jurisdiction of:

New York

This certification is valid from the date of issuance and expires May 30, 2009

NY-2233-1

Certification #

JUN - 5 2006

Issued On

Kenneth S. Stoller

Kenneth S. Stoller, P.E., QEP, DEE, Chief

Pesticides & Toxic Substances Branch

TSC
providing TOTAL SAFETY CONSULTING
5 Court Square
Long Island City, NY 11101
718.389.2103 - Fax: 718.389.6155
www.totalsafety.org



NYC DOB 4-HR Supported Scaffold User Certificate

Name: Vijay Patel
Director: Tom Ferrante **Class Date: 06/19/2007**

Exp. Date: 06/19/2011 **Card No. SS07-2653**

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



VIJAY B PATEL
CLASS(EXPIRES)
C ATEC(05/08) D INSP(05/08)
E MGPL(05/08) H PM (05/08)
I PD (05/08)

CERT# 98-12523

MUST BE CARRIED ON ASBESTOS PROJECTS

NYC DEP Asbestos Control Program
Asbestos Certificate



PATEL,
VIJAY B
INVESTIGATOR
103029
EXPIRES: 5/13/2008

Must be carried on all asbestos projects

NYC DEP Asbestos Control Program
Asbestos Certificate



PATEL,
VIJAY B
INVESTIGATOR
110337
EXPIRES: 5/13/2010
DOB: [redacted] M 5' 06"

Must be carried on all asbestos projects

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



VIJAY B PATEL
CLASS(EXPIRES)
C ATEC(05/09) D INSP(05/09)
E MGPL(05/09) H PM (05/09)
I PD (05/09)

CERT# 98-12523
DMV# [redacted]

MUST BE CARRIED ON ASBESTOS PROJECTS

New York
PROJECT DESIGNER



Certified Lead-Based
Paint Professional

Certification No NY-P-2789-1	
Date of Birth	Expiration Date 09/29/2009
Address	
Badge Holder's Name Vijay B. Patel	
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
US EPA
1200 Pennsylvania Ave, NW
(MC-74040T)
Washington, DC 20460
or call 1-800-424-LEAD

New York
RISK ASSESSOR



Certified Lead-Based
Paint Professional

Certification No NY-R-2789-1	
Date of Birth	Expiration Date 09/29/2009
Address	
Badge Holder's Name Vijay B. Patel	
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
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1200 Pennsylvania Ave, NW
(MC-74040T)
Washington, DC 20460
or call 1-800-424-LEAD

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STATE OFFICE CAMPUS
ALBANY NY 12240

New York
RISK ASSESSOR



Certified Lead-Based
Paint Professional

New York
INSPECTOR



Certified Lead-Based
Paint Professional

New Jersey Department of
Health & Senior Services
Indoor Environments Program
Lead Certification Permit



SANJAY B PATEL
Permit Number: 017721
ID Number: 006046
Expiration Date: 3/28/2009



Authorization Signature: James A. Buonadies, Director

Inspector/Risk Assessor

NJ Department of Community Affairs
Division of Codes and Standards
Bureau of Code Services



This is to certify that

Sanjay Patel

has been certified as:
Asbestos Safety Technician

Certification #	**01110**
Effective Date	**8/1/2007**
Expiration Date	**7/31/2009**

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providing TOTAL SAFETY CONSULTING
5 Court Square
Long Island City, NY 11101
718.389.2103 - Fax: 718.389.6155
www.totalsafety.org



NYC DOB 4-HR Supported Scaffold User Certificate

Name: Sanjay Patel
Director: Tom Ferrante **Class Date: 06/19/2007**

Exp. Date: 06/19/2011 **Card No. SS07-2672**

NYC DEP Asbestos Control Program
Asbestos Certificate



PATEL,
SANJAYKUMAR B
INVESTIGATOR
108041
EXPIRES: 9/18/2009

Must be carried on all asbestos projects

Certification No NY-I-4643-1	
Date of Birth	Expiration Date 11/20/2009
Address	
Badge Holder's Name	Sanjay B Patel
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
US EPA
1200 Pennsylvania Ave, NW
(MC-7404OT)
Washington, DC 20460
or call 1-800-424-LEAD

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



SANJAYKUMAR PATEL
CLASS(EXPIRES)
C ATEC(09/08) D INSP(09/08)
H PM (09/08)

CERT# 98-10216

MUST BE CARRIED ON ASBESTOS PROJECTS

THIS CARD IS ISSUEDPURSUANT TO
N.J.S.A. 52:27D-119 ET SEQ OF THE
STATE OF NEW JERSEY

CHIEF
BUREAU OF CODE SERVICES

Certification No NY-R-4643-1	
Date of Birth	Expiration Date 11/20/2009
Address	
Badge Holder's Name	Sanjay B Patel
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
US EPA
1200 Pennsylvania Ave, NW
(MC-7404OT)
Washington, DC 20460
or call 1-800-424-LEAD

This card in no way certifies or verifies this individuals competency in the safe operation of scaffolds

If found, please contact TSC at (718) 389-2103

EYES BLK
HAIR BLK

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 290A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

This certificate must be shown to a NYCDEP representative upon request. Report loss immediately to NYCDEP Asbestos Control Program, 8th floor 59-17 Junction Blvd., Flushing, NY 11373

This PERMIT has been issued in accordance with N.J.A.C. 8:62. You MUST have this PERMIT with you on the job. To report a lost or stolen permit, notify us of edits to information on a permit, report change of address, report defects in card, or to find out how to renew a permit, contact the NJDHSS at:
New Jersey Department of Health & Senior Services
Consumer & Environmental Health Services
Indoor Environments Program, Training and Certification
3635 Quakerbridge Road, PO Box 372
Trenton, NJ 08625-0372
Telephone: (609) 631-6749 Fax: (609)588-7618
www.state.nj.us/health/eoh/leadasb/
If this permit is found abandoned, please send to above address.

DA 5/14/2007

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200546-0

AmeriSci New York

New York, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

BULK ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2008-07-01 through 2009-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

AmeriSci New York
DBA: AmeriSci New York
117 E. 30th Street
New York, NY 10016
Mr. Paul Mucha
Phone: 212-679-8600 Fax: 212-679-2711
E-Mail: pmucha@amerisci.com
URL: http://www.amerisci.com

BULK ASBESTOS FIBER ANALYSIS (PLM) **NVLAP LAB CODE 200546-0**

NVLAP Code	*Designation / Description*
18/A01	EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples

2008-07-01 through 2009-06-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200546-0

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2008-07-01 through 2009-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

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AIRBORNE ASBESTOS FIBER ANALYSIS (TEM) **NVLAP LAB CODE 200546-0**

NVLAP Code	*Designation / Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

2008-07-01 through 2009-06-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
RICHARD F. DAINES, M.D.

Expires 12:01 AM April 01, 2009
Issued April 01, 2008

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NY Lab Id No: 11480
EPA Lab Code: NY01378

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ENVIRONMENTAL ANALYSES POTABLE WATER
All approved subcategories and/or analytes are listed below:

Drinking Water Miscellaneous

Asbestos	EPA 100.1
	EPA 100.2

Serial No.: 36239

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All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	EPA 600/M4/82/020
	Item 198.1 of Manual
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	ITEM 198.4 OF MANUAL

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NY Lab Id No: 11480
EPA Lab Code: NY01378

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ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
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Miscellaneous Air

Asbestos	40 CFR 763 APX A No. III
	YAMATE,AGARWAL GIBB
Fibers	NIOSH 7400 A RULES

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SUPPLEMENTAL GROUNDWATER INVESTIGATION REPORT

Kingsbridge Armory
29 West Kingsbridge Road
Bronx, New York

Prepared For:

Related Retail
60 Columbus Circle
New York, New York

Prepared By:

Langan Engineering & Environmental Services, P.C.
360 West 31st Street, 8th Floor
New York, New York

June 17, 2009
Langan Project No. 5815101

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

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Appendix B Soil Boring Logs
Appendix C: Monitoring Well Construction Logs
Appendix D: Groundwater Sampling Logs
Appendix E: Laboratory Analytical Report (Spectrum)

1.0 INTRODUCTION

Langan Engineering & Environmental Services, P.C. (Langan) has prepared this Supplemental Groundwater Investigation Report in support of the redevelopment of the Kingsbridge Armory facility at 29 West Kingsbridge Road in the Bronx, New York ("the Site"). This report presents the results of supplemental groundwater sampling that was conducted at the Site and on the adjacent National Guard property that borders the Site to the north. The objective of the supplemental investigation was to determine whether two abandoned underground storage tanks (USTs) on the National Guard property are the source of groundwater impacts that were detected in a monitoring well in the Armory building during a 2008 Phase II Environmental Site Investigation (ESI). The supplemental investigation also included follow-up sampling of the well in which impacts were detected.

2.0 BACKGROUND

The Kingsbridge Armory is being considered for redevelopment as a multiple-use community, educational, and retail facility. The project site is located on the city block bordered by West 195th Street to the north, West Kingsbridge Road to the south, Jerome Avenue to the east, and Reservoir Avenue to the west. The Armory is bordered to the north along West 195th Street and Reservoir Road by two New York State National Guard (National Guard) maintenance buildings and a parking lot. A Site Location Map is provided as Figure 1.

Langan conducted a Phase II ESI of the Armory property in October 2008. Five volatile organic compounds (VOCs) and one semi-volatile organic compound (SVOC) were detected in well MW-3, which was installed in the northwestern portion of the sub-cellar of the Armory, at concentrations above the New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards (AWQS). Elevated organic vapor concentrations were also detected in soil samples collected from MW-3 and nearby borings. The Phase II ESI did not reveal an obvious source for the groundwater impacts; however, a 2007 environmental investigation conducted by TRC, Inc. identified two, abandoned 3,000-gallon and 2,000-gallon diesel and gasoline USTs located under the parking area of the National Guard property northwest of the Armory building. TRC's investigation indicated that the tanks were likely closed in September 1993. Based on the proximity of the former USTs to well MW-3, the tanks were deemed potential sources of impacted groundwater at the Site. This supplemental investigation was conducted to evaluate the off-site USTs as sources of VOC and SVOC contamination at the Site.

2.0 SUPPLEMENTAL GROUNDWATER INVESTIGATION

Langan conducted the Supplemental Groundwater Investigation on May 27 and 28, 2009. The investigation included a geophysical survey, advancement of soil borings, installation of a monitoring well, and groundwater sampling.

2.1 Geophysical Survey

Under Langan's oversight, Nova Geophysical Services of Forest Hills, New York conducted a geophysical survey in the western parking lot of the National Guard property on May 27, 2009. The survey was conducted to identify potential utilities at proposed Geoprobe boring locations and to locate the two decommissioned USTs and associated piping. The survey utilized an electromagnetic metal detector (Geonics EM-61 Pipe Locator) and a ground penetrating radar (GPR) system (MALA 250 MHz to 500 MHz GPR units). The survey methodology is discussed in detail and the survey location plan is provided in Nova's Geophysical Engineering Survey Report, which is included as Appendix A.

The survey identified two anomalies consistent with USTs underneath the southeastern and northeastern portions of the parking lot, with dimensions of approximately 19- by 27- ft and 9- by 19- ft, respectively. The UST locations were consistent with those identified in TRC's 2007 investigation report. The survey identified two former pump islands along the eastern boundaries of the USTs. The survey also detected anomalies consistent with a water line and north-south oriented sewer line that enter the parking lot from West 195th Street and transect the central and northeastern portions of the parking lot.

3.2 Soil Borings and Groundwater Monitoring Well Installation

3.2.1 Soil Borings

Two direct-push soil borings (MW-4 and MW-5) were advanced with a track-mounted Geoprobe 7730DT unit in the National Guard property parking lot. The borings were advanced in preparation for installation of two monitoring wells between the southern-most UST and the northwestern portion of the Armory property. Soil samples were collected continuously from each boring into new, dedicated acetate liners with a 2-inch diameter, 5-ft macrocore sample barrel. Soil retrieved from each boring was classified for soil type and screened for organic vapors with a photoionization detector (PID).

Boring PMW-4 was advanced to 34 ft below the top of concrete, and groundwater was encountered at approximately 27 ft below top of concrete. Refusal was encountered in either rock or concrete at 18 ft below the top of concrete during advancement of boring PMW-5. Two offset borings advanced 5 ft and 9 ft west of boring PMW-5 encountered refusal at 14.5 ft and 15 ft below the top of concrete, respectively. Groundwater was not encountered in boring

MW-5 or the two offset locations. The presence of a concrete wall east of PMW-5, the Armory Building south of PMW-5, and buried utilities in this area limited access for the advancement of additional offset borings. Boring refusal and spatial limitations therefore precluded installation of well MW-5. The detailed boring logs are included as Appendix B. The soil boring locations are shown in Figure 2.

3.2.2 Monitoring Well Installation

Groundwater monitoring well MW-4 was installed in the soil boring advanced near the southwestern corner of the southern-most UST. The well was constructed of 2-inch diameter threaded, flush-joint PVC riser and 10 ft of 0.01-inch slot screen. The screen was placed across the water table interface, and the annulus was filled with clean sand (Morie #1) to a height of approximately six inches to one foot above the top of the screened interval. A two- foot layer of hydrated bentonite clay was placed above the sand pack to seal the well. The remainder of the annular space was filled with soil cuttings from the boring. The remaining soil cuttings were placed in a sealed and labeled 55-gallon drum and stored on the National Guard property pending disposal. The well was completed with a flush mount, steel well cover set into concrete and over the well for protection. A monitoring well construction log is provided in Appendix C.

3.3 Groundwater Sampling

Three groundwater samples were collected from MW-4, TRC-MW-3, which TRC installed west of the southern-most decommissioned UST, and MW-3, which is located in the northwestern portion of the sub-cellar of the Armory building. Because well MW-3 was installed with one-inch diameter riser, a peristaltic pump and dedicated, disposable polyethylene tubing were used to purge the well. Wells MW-4 and TRC-MW-3 were purged with a 2-inch diameter submersible pump and sampled in general accordance with procedures set forth in the U.S. EPA's low-flow groundwater sampling procedure to allow for collection of a representative sample ("Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures", EPA/540/S-95/504, April 1996).

The static water level in each well was measured to the nearest 0.01 foot with a decontaminated oil/water interface probe. Prior to sample collection, each well was purged at a rate less than 0.5 liters per minute in order to minimize drawdown and sample turbidity. During purging and sampling, monitoring well effluent was pumped into a flow-through cell attached to a Horiba U-22 Water Quality Monitoring System probe (Horiba U-22). The Horiba U-22 was used to monitor the purge water for hydrogen ion concentration (pH), oxidation/reduction potential, conductivity, temperature, dissolved oxygen, and turbidity. Five well volumes were purged until variations between successive groundwater parameter measurements had stabilized to within 10 percent. Purge water was contained in two 55-gallon drums, labeled,

and stored on the National Guard property. Groundwater sampling logs are provided in Appendix C.

The samples were collected into laboratory-provided containers, which were labeled and placed in ice-filled coolers pending delivery to the lab under proper chain-of-custody protocol. The samples were submitted to Spectrum Analytical, Inc. (Spectrum) of Agawam, Massachusetts for analysis of VOCs and SVOCs via EPA Methods 8260 and 8270, respectively. Spectrum is a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP) certified laboratory. A Groundwater Sample Location and Results Map is provided in Figure 3.

4.0 OBSERVATIONS AND RESULTS

4.1 Field Observations

Soil observed in the borings consisted of fill, which is comprised of brown fine to coarse-grained sand with traces of silt, gravel, timber, concrete, and brick. Groundwater was encountered in monitoring wells TRC-MW-3 and MW-4 at a depth of approximately 27 ft below the top of concrete in the parking lot. The depth to groundwater in MW-3 was 4.2 ft below the top of the sub-cellar floor slab.

Field indications of a spill or other impacts to soil on the National Guard property were not observed during the investigation. PID readings in soil boring MW-4 ranged from 1.0 ppm (24-26 ft depth interval) to 1.9 ppm (4-5 ft depth interval). PID readings in the three MW-5 offset borings ranged from 0.0 ppm to 0.6 ppm. Minor staining was observed in conjunction with asphalt fragments in soil samples collected from below the concrete in boring MW-4 and the MW-5 offset borings. Consistent with Langan's observations during the 2008 Phase II ESI, a petroleum odor was observed in monitoring well MW-3 in the Armory sub-cellar.

4.2 Analytical Results

Analytical results from the groundwater samples were compared to NYSDEC TOGS AWQS. One VOC, 4-isopropyltoluene, was detected in the groundwater sample collected from well MW-4 at a concentration of 804 µg/L, which exceeds the TOGS AWQS standard of 5 ug/L. VOCs and SVOCs were not detected at concentrations above TOGS AWQS in the groundwater samples collected from wells MW-3 and TRC-MW-3. Seven VOCs (naphthalene, n-butylbenzene, n-propylbenzene, isopropylbenzene, methyl tert-butyl ether, toluene, and 4-isopropyltoluene were detected in the sample collected from well MW-3 at concentrations below the TOGS AWQS. Analytical detections of VOCs and SVOCs in the groundwater samples are presented in Table 1. The laboratory analytical report is provided in Appendix E.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the field observations and analytical results from the soil borings and groundwater samples, we conclude that:

- The elevated VOC and SVOC concentrations observed in well MW-3 during the 2008 investigation appear to have attenuated to levels below regulatory standards and were not detected during this supplemental investigation, and
- Evidence of an off-site spill associated with the decommissioned USTs on the National Guard property is not present.

Further investigation is not recommended at this time.

6.0 LIMITATIONS

This Supplemental Groundwater Investigation report was prepared expressly for Related Retail for the Kingsbridge Armory Project in the Bronx, New York and for the objectives defined herein (due diligence). Langan cannot assume responsibility for the use of this Report for any property other than the specific site addressed in this report, or by any third party without specific written authorization from Langan.

The conclusions, opinions, and recommendations provided in this report are based on subsurface conditions ascertained from the analysis of a limited number of samples and from environmental reports prepared by other professionals that were provided by "the Client". Recommendations provided are contingent upon one another and no recommendation should be followed independent of the others. Actual conditions encountered may differ substantially from those presented herein and should be brought to our attention whereby we may determine how such changes may affect our conclusions, opinions and recommendations.

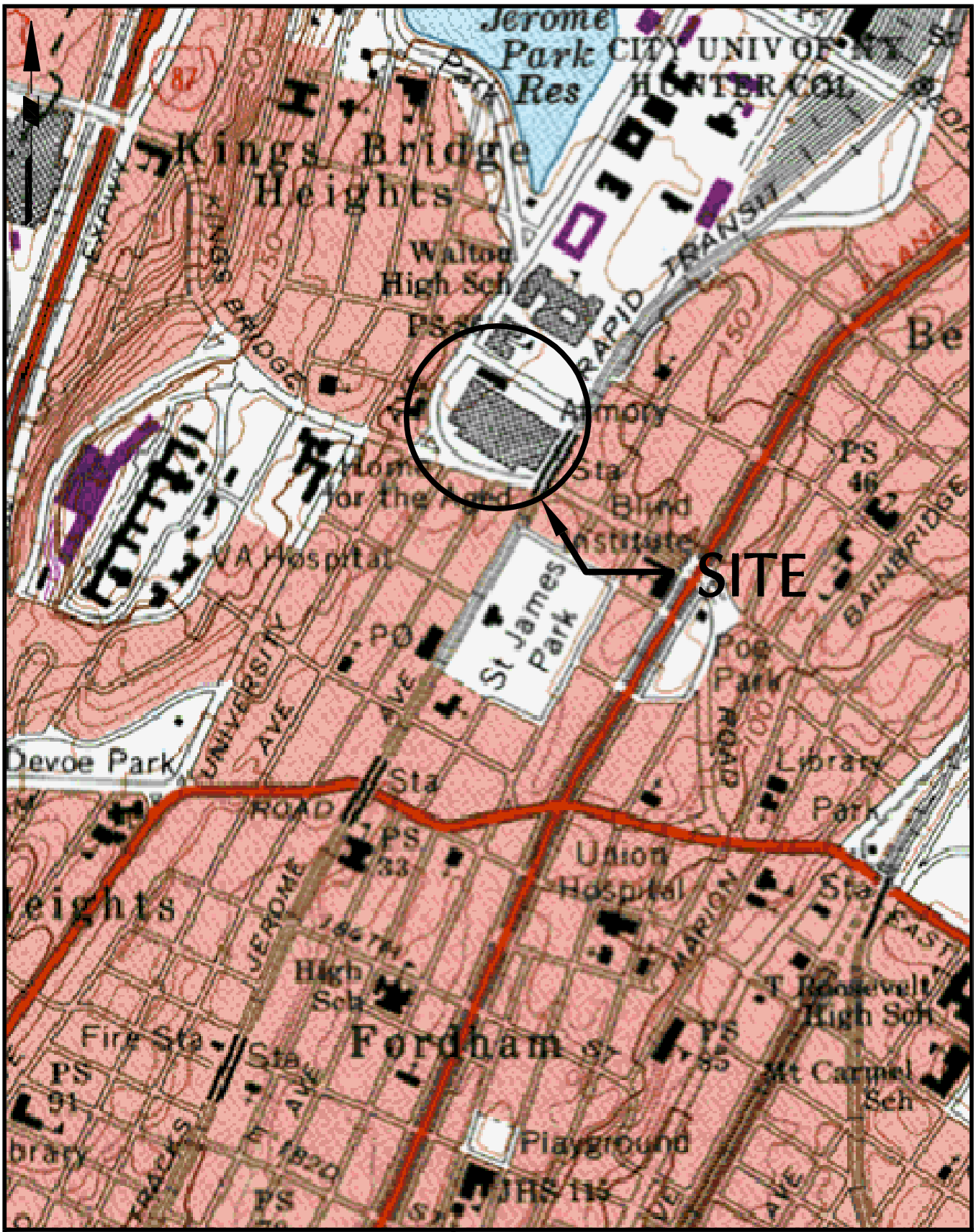
TABLE 1
ANALYTICAL DETECTIONS OF VOCs and SVOCs IN GROUNDWATER SAMPLES
SUPPLEMENTAL GROUNDWATER INVESTIGATION
KINGSBRIDGE ARMORY
BRONX, NEW YORK
LANGAN PROJECT NO. 5815101

Sample ID Lab Sample Number Sampling Date	NYSDEC TOGS 1.1.1 AMBIENT WATER QUALITY STANDARDS	PMW-4/5-27-09 220-6174-2 5/27/2009 15:40		PMW-4/5-27-09 220-6249-2 5/27/2009 15:40		TRC-MW-3/5-27-09 220-6249-1 5/27/2009 12:30			MW-3/5-28-09 220-6147-1 5/28/2009 14:50		
VOCs (µg/L)											
4-Isopropyltoluene	5	**804**	E	**626**	V11	<	0.5	U		1.9	
Acetone	50*	8.9	J	NA		<	2.6	U	<	2.6	U
Chloroform	7	1.4		NA		<	0.8	U	<	0.8	U
cis-1,2-Dichloroethene	5	< 0.4	U	NA			0.4	J	<	0.4	U
Isopropylbenzene	5	< 0.4	U	NA		<	0.4	U		0.5	J
Methyl tert-butyl ether	10	< 0.3	U	NA		<	0.3	U		0.6	J
Naphthalene	10	< 0.7	U	NA		<	0.7	U		5.1	
n-Butylbenzene	5	< 0.6	U	NA		<	0.6	U		2.9	
n-Propylbenzene	5	< 0.6	U	NA		<	0.6	U		1	
Tetrachloroethene	5	1		NA			0.5	J	<	0.5	U
Toluene	5	< 0.6	U	NA		<	0.6	U		0.7	J
Trichloroethene	5	0.9	J	NA		<	0.5	U	<	0.5	U
SVOCs (µg/L)											
Total SVOCs	--	ND		ND		ND			ND		

NOTES:
Groundwater samples were compared to New York State Department of Environmental Conservation (NYSDEC) Technical and Operations Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS).
Only detected concentrations are presented.
NYSDEC TOGS exceedances are highlighted and in **BOLD.**

VOCs: Volatile Organic Compounds
SVOCs: Semi-Volatile Organic Compounds
µg/L: Micrograms per Liter

QUALIFIERS
U = Analyte was not detected at or above the reporting limit.
J = Laboratory esitmated value.
* = Value is a TOGS Guidance Value and not a standard.
ND = Non detected
V11 = Analyte concentration confirmed by duplicate analysis.
E = The concentration indicated for this analyte is an estimated value.
-- = No standard
NA = Not analysed



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NEW JERSEY PENNSYLVANIA **NEW YORK** CONNECTICUT FLORIDA NEVADA

NJ Certificate of Authorization No: 24GA27996400

SITE LOCATION MAP

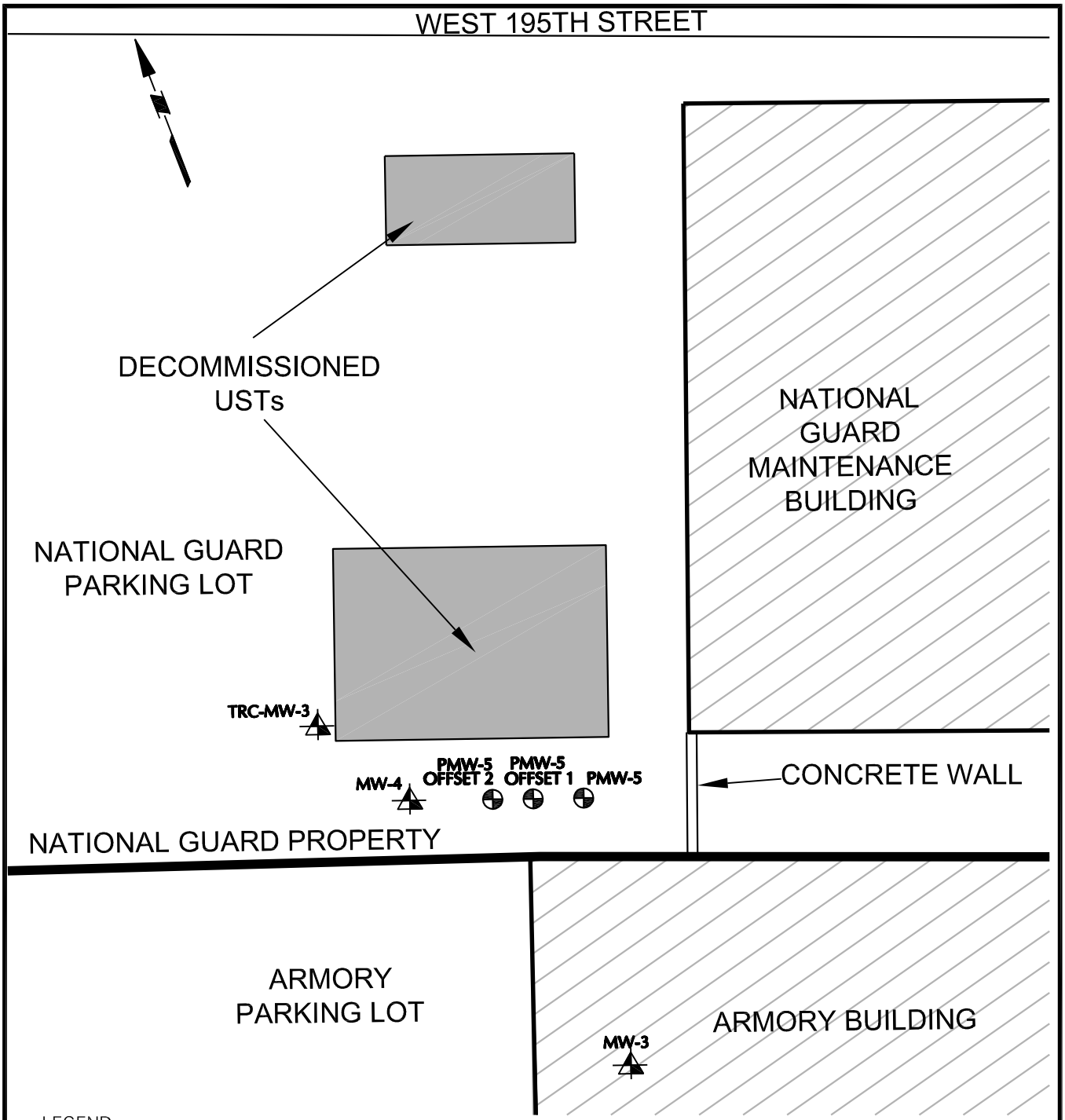
KINGSBRIDGE ARMORY

BRONX NEW YORK

Project No.	Date	Scale	Dwg. No.
5815101	6/12/09	NTS	1

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Filename: U:\Data1\5815101\Cadd Data - 5815101\Dwg\Environmental\Site Location Map.dwg Date: 6/17/2009 Time: 18:02 User: sknoop Style Table: Langan.stb Layout: A Size Sheet (Bottom)



LEGEND

- TRC-MW-3 — MONITORING WELL INSTALLED BY TRC DURING 2007 INVESTIGATION
- MW-4 — MONITORING WELL
- PMW-5 — SOIL BORING
- SITE BOUNDARY
- BUILDING OUTLINE

NOTES:

1. PLAN TAKEN FROM "SUBSURFACE INVESTIGATION PLAN (EXISTING CONDITIONS)" BY LANGAN ENGINEERING, DATED AUGUST 15, 2008.

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GROUNDWATER MONITORING WELL AND SOL BORING PLAN

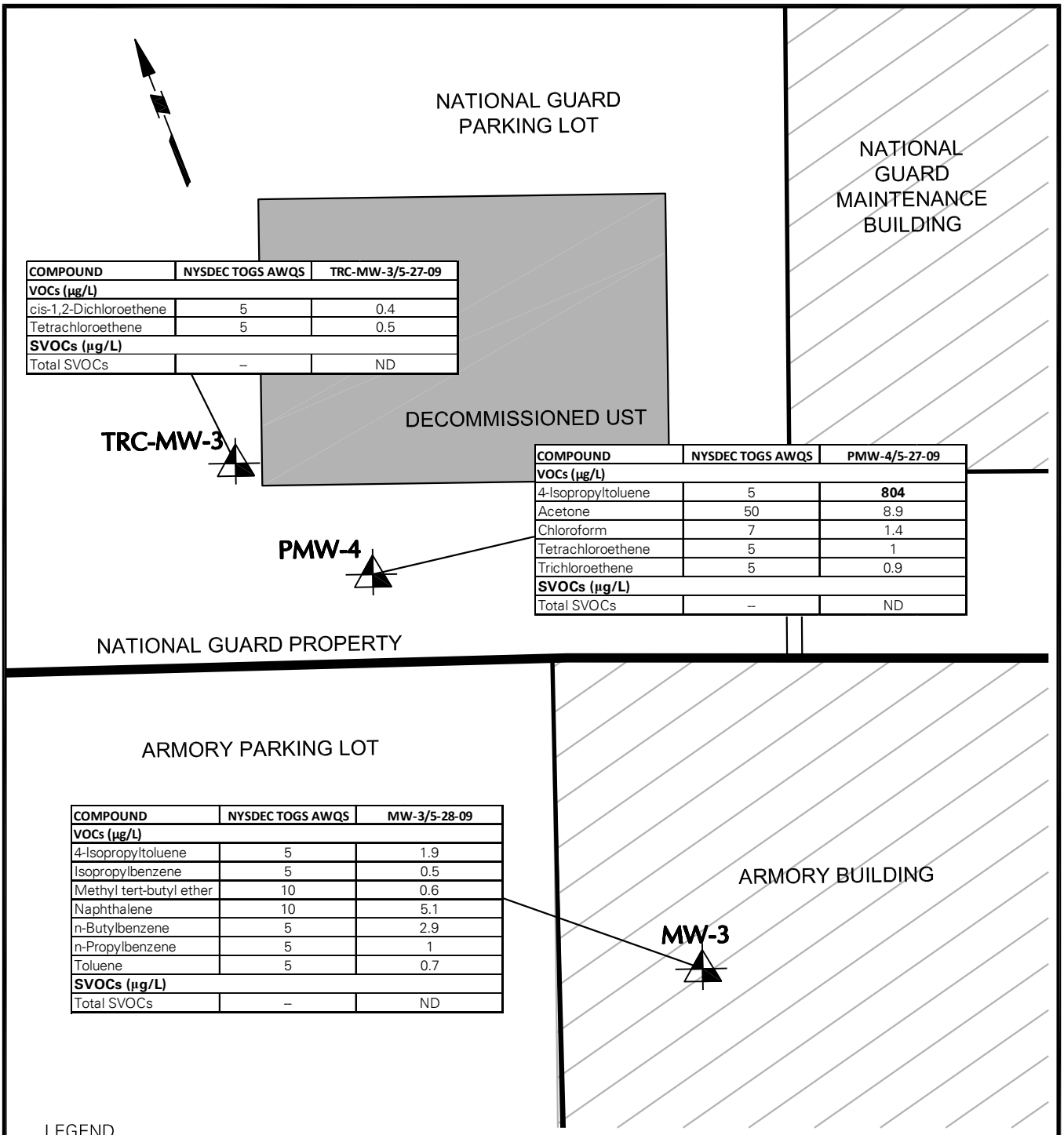
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BRONX NEW YORK

Project No.	Date	Scale	Dwg. No.
5815101	6/16/09	1" = 15'	2

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Filename: U:\Data1\5815101\Cadd Data - 5815101\Dwg\Environmental\Groundwater Monitoring Well Plan.dwg Date: 6/17/2009 Time: 18:08 User: sknoop Style Table: Langan.stb Layout: Fig 1 - Nat'l Guard



COMPOUND	NYSDEC TOGS AWQS	TRC-MW-3/5-27-09
VOCs (µg/L)		
cis-1,2-Dichloroethene	5	0.4
Tetrachloroethene	5	0.5
SVOCs (µg/L)		
Total SVOCs	–	ND

COMPOUND	NYSDEC TOGS AWQS	PMW-4/5-27-09
VOCs (µg/L)		
4-Isopropyltoluene	5	**804**
Acetone	50	8.9
Chloroform	7	1.4
Tetrachloroethene	5	1
Trichloroethene	5	0.9
SVOCs (µg/L)		
Total SVOCs	--	ND

COMPOUND	NYSDEC TOGS AWQS	MW-3/5-28-09
VOCs (µg/L)		
4-Isopropyltoluene	5	1.9
Isopropylbenzene	5	0.5
Methyl tert-butyl ether	10	0.6
Naphthalene	10	5.1
n-Butylbenzene	5	2.9
n-Propylbenzene	5	1
Toluene	5	0.7
SVOCs (µg/L)		
Total SVOCs	–	ND

LEGEND

PMW-4 GROUNDWATER SAMPLE LOCATION

SITE BOUNDARY

BUILDING OUTLINE

NOTES:

1. ONLY DETECTED CONCENTRATIONS ARE PRESENTED.
2. NYSDEC TOGS AWQS EXCEEDANCES ARE **BOLD**.
3. ND = NON-DETECT.
4. PLAN TAKEN FROM "SUBSURFACE INVESTIGATION PLAN (EXISTING CONDITIONS)" BY LANGAN ENGINEERING, DATED AUGUST 15, 2008.

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NJ Certificate of Authorization No: 24GA27996400

GROUNDWATER SAMPLE LOCATION AND RESULTS MAP
KINGSBRIDGE ARMORY

BRONX NEW YORK

Project No.	Date	Scale	Dwg. No.
5815101	6/12/09	1" = 10'	3

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Filename: U:\Data1\5815101\Cadd Data - 5815101\Dwg\Environmental\Groundwater Sample Location and Results Map.dwg Date: 6/17/2009 Time: 18:06 User: sknoop Style Table: Langan.stb Layout: Fig 1 - Nat'l Guard

PHASE II SUPPLEMENTAL ENVIRONMENTAL SITE INVESTIGATION REPORT

For

Kingsbridge Armory
29 West Kingsbridge Road
Bronx, New York
CEQR #13DME013X

Prepared For:

Kingsbridge National Ice Center
c/o Correll Law Group
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Prepared By:

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Joel B. Landes, P.E.
Vice President

June 7, 2013
Langan Project No. 170246501

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FIGURES

Figure 1: Site Location Map
Figure 2: Soil Boring, Monitoring Well, and Soil Vapor Probe Location Plan
Figure 3: Soil Sample Locations and Results Map
Figure 4: Groundwater Sample Locations and Results Map
Figure 5: Soil Vapor Sample Locations and Results Map

APPENDICES

Appendix A: Soil Boring Logs
Appendix B: Well Construction Logs
Appendix C: Groundwater Sampling Logs
Appendix D: Soil Vapor and Air Sampling Logs
Appendix E: Analytical Laboratory Results and Chain of Custody Documentation (CD)

1.0 INTRODUCTION

This Phase II Supplemental Environmental Site Investigation (SESI) was conducted for the Kingsbridge Armory property at 29 Kingsbridge Road (Tax Block 3247, Lot 2) in the Bronx, New York (The "Site"). The Site is being considered for redevelopment as the Kingsbridge National Ice Center (KNIC), a multiple use ice skating and recreational facility. The KNIC project is undergoing review by the City of New York in accordance with Uniform Land Use Review Procedure (ULURP). Accordingly, all investigative and remediation activities are subject to review and approval by the New York City Department of Environmental Protection (NYCDEP).

Langan and TRC Environmental Corporation conducted extensive soil and groundwater investigations at the Site between 2007 and 2009 during an earlier joint redevelopment effort. As such, the sub-surface environmental conditions underneath the armory building and exterior areas are well documented. As approximately four years have passed since the most recent environmental investigation and the current redevelopment plan incorporates a new design and Site use, this SESI was conducted to augment the existing data and address potential new areas of soil disturbance during redevelopment.

This Phase II SESI Report presents the environmental data and findings from the Site Investigation that was conducted between May 14 and 24, 2013.

2.0 PROJECT BACKGROUND

2.1 Site Description

The project site is at the center of a city block bordered by West 195th Street to the north, West Kingsbridge Road to the south, Jerome Avenue to the east, and Reservoir Avenue to the west (Figure 1). Most of the Site is occupied by the landmark Kingsbridge Armory building (Armory), which was constructed on an approximately 200,000-square-foot (sq-ft) footprint between 1912 and 1917, over the abandoned east basin of the Jerome Park Reservoir. An asphalt-paved parking area is located along the western perimeter of the Site along Reservoir Avenue, and landscaped areas border the southern perimeter of the structure along West Kingsbridge Road. Two National Guard annex buildings and a parking area border the Site to the north along West 195th Street.

The main drill hall at the center of the Armory measures approximately 300 by 600 feet (ft) and is spanned freely by an arched roof framing that rises 110 ft above the drill hall floor. Beneath the drill floor, two cellar levels formerly housed offices, a garage, a gymnasium, rifle and pistol ranges, and rooms for other military functions. The drill hall is flanked to the south by a two-

story head house with a single cellar floor and four towers that contain offices and residential quarters. The eastern portion of the sub-cellar area underlies the Jerome Avenue sidewalk. The sub-cellar of the Armory building is accessible by a ramp that extends from West 195th Street. The Site is currently owned and operated by the City of New York.

The Armory has remained unused since the 2009 environmental investigation, with the exception that an interior parking area is used for the staging of City graffiti removal vehicles. Occasional events are also held inside the central drill hall. No significant changes of use since the previous environmental investigations are apparent on adjacent and nearby properties.

2.2 Proposed Site Redevelopment

KNIC proposes to convert the interior of the Armory into a national ice rink facility with two levels of parking provided in the cellar and sub-cellar. Multiple ice rinks will be constructed within the shell of the central drill hall, including a main, ground-level rink with surrounding bleachers. Additional ice rinks will be constructed on the ground level and a mezzanine level on either side of the main rink. Vehicle access ramps to the cellar parking garages and loading docks will span between the building and West 195th Street to the north and Reservoir Avenue to the west. The sub-cellar parking area will be constructed at the elevation of the current floor slab. Mass excavation of soil and removal of groundwater are therefore not anticipated during the redevelopment project. Soil excavation underneath the western parking area and northern moat area adjoining West 195th Street may be required to accommodate the construction of footings for the access ramps. Additionally, soil may be excavated to install new caisson support structures for the building.

2.3 Previous Investigations

The following environmental reports were generated on behalf of Related Retail and the New York City Economic Development Corporation during the initial Kingsbridge Armory redevelopment effort:

Phase I Environmental Site Assessment (ESA), Kingsbridge Armory, dated September 2006; prepared by Metcalf & Eddy

This Phase I ESA was conducted on behalf of the New York City Economic Development Corporation (EDC) and identified the following environmental concerns:

- Industrial and commercial use of properties in the surrounding area may have impacted groundwater at the Site.
- Potential contamination from on-site fill materials may have impacted groundwater at the Site.

- One 275-gallon fuel oil aboveground storage tank (AST) was identified on the northeast portion of the drill room floor, and two 275-gallon fuel oil ASTs were identified on the southwest portion of the sub-cellar.
- A petroleum odor was noted in a room (B-20) on the western portion of the cellar; however, a source for the odor was not identified.
- Multiple containers of petroleum products were observed in the motor pool workshops of the cellar area, and ten 55-gallon steel drums were noted in the vehicle storage area in the sub-cellar. The drums were partially deteriorated and were generally free of liquids.
- Oil staining and a saw cut in the concrete floor near the center of the sub-cellar vehicle storage area indicated a possible former underground storage tank (UST).
- Three earthen-floored rifle and pistol ranges were observed in the sub-cellar, and were suspected to contain elevated concentrations of lead from spent munitions.
- Three New York State Department of Environmental Conservation (NYSDEC) spills are associated with the Site:
    - Spill Number 8802461 was reported in 1988 when a Fuel Oil No. 2 UST failed a tightness test. The regulatory database stated that the last of seven USTs were scheduled to be removed from the Site in August 2004, and the spill was closed on August 10, 2004.
    - Spill Number 9211568 was reported in 1993 when soil contamination from piping was detected during removal of a tank. The spill was closed on March 25, 2005.
    - Spill Number 9308016 was reported in 1993 when a diesel tank failure was reported during removal of the tank. According to the database entry, 100 yards of soil was stockpiled on the Site, and the spill remained open as of September 2006. Langan's research of NYSDEC's Spill Incidents Database website revealed that the spill was closed on June 3, 2008.
- Potentially hazardous materials, such as PCBs, asbestos, lead-based paint, lubricating oils, mold, and refrigerants, were associated with the cellar boiler unit and air conditioning units and construction materials throughout the structure.
- One 2,000-gallon fuel oil UST was reported to be in service at the adjacent property to the north along West 195th Street. Four USTs were reported to have been closed at the adjacent property in 1993, 1995, and 1999.

The Phase I ESA report recommended that additional sampling for asbestos, lead-based paint and PCB-containing materials be conducted at the property. The report also recommended the removal and proper disposal of the three ASTs, 55-gallon drums, petroleum products, earth floors of the rifle and pistol ranges, and deteriorating boiler and air conditioning equipment.

Phase II Environmental Site Assessment Report, Kingsbridge Armory, dated September 19, 2007; prepared by TRC Environmental Corporation

This Phase II ESA was conducted to investigate recognized environmental conditions identified in the Phase I ESA report. The report confirmed the presence of the three ASTs and stated that the AST on the drill hall floor still contained diesel fuel for an emergency generator that was no longer operable. Several empty 55-gallon drums with no evidence of potential release were observed in the vehicle storage area and suspect lead-based paint, PCB-containing light ballasts, asbestos-containing materials, and areas of mold growth were noted in the Armory. This report did not identify the saw cut area in the sub-cellar discussed in the September 2006 Phase I ESA.

The report summarized a geophysical survey conducted in August 2000. The survey identified:

(1) an abandoned fill port and vent pipe and a 12 by 15-ft area of removed pavement that are likely associated with a former UST along the western exterior of the Armory building;

(2) a 30 by 30-ft electromagnetic anomaly indicating a potential UST along the Armory's western exterior south of the aforementioned former UST; and

(3) two vent pipes and two areas of patched asphalt possibly associated with two USTs on the northwest portion of the site adjacent to the maintenance building (not included in the subject area for Langan's ESI).

TRC coordinated a follow-up geophysical survey during the Phase II ESA. The follow-up survey found no evidence of buried metal near the 12-ft by 15-ft saw-cut area, but noted a near-by fill pipe labeled with the word "Gasoline". The report noted that a guard booth had been constructed at the potential former UST location. The survey noted no indications of potential USTs at the 30 by 30-ft anomaly and suggested that the reinforced concrete area may be associated with the former reservoir pump house that was located west of the Armory building.

TRC's subsurface investigation included excavation of three test pits, advancement of 13 soil borings, and installation of four groundwater monitoring wells along the western portion of the property near the potential USTs. In addition, 18 soil samples were collected from the upper 1.5-ft depth interval in the pistol and rifle ranges. TRC reported the following:

Test Pits near Maintenance Building

- Although this area is not part of the project Site, the environmental issues identified may impact project Site conditions. Test pit excavations confirmed two abandoned USTs west of the maintenance building. The tanks appeared to have been cut open and filled with sand and gravel. Organic vapors indicative of petroleum impacts were not reported in the sand and gravel and rain water that had accumulated within the former USTs. The report noted that the tanks were likely the 3,000-gallon diesel and 2,000-gallon gasoline USTs that were closed in September 1993, discussed in the Phase I ESA.

Soil Samples West of the Armory Building

- Slightly elevated organic vapor concentrations were detected in two borings on the northwest portion of the property west of the maintenance building near the former USTs.
- Semi-volatile organic compounds (SVOCs) and metals (beryllium, chromium, copper, iron, nickel, and zinc) were detected at concentrations above NYSDEC Technical and Administrative Guidance Memorandum (TAGM) 4046 recommended soil cleanup objectives (RSCOs) in multiple soil samples collected from the western portion of the Site. Based on the absence of coincident field indications of contamination at these locations, TRC concluded that the SVOC detections are likely associated with urban fill conditions at the Site.
- Volatile organic compounds (VOCs), PCBs, and pesticides were not detected in soil samples at concentrations that exceeded TAGM RSCOs.

Groundwater Samples West of the Armory Building

- One VOC, hexachlorobutadiene, was detected at a concentration above the NYSDEC Technical and Operational Guidance Series (TOGS) Ambient Water Quality Standards in a groundwater sample collected from the well located adjacent to the former gasoline UST near the western exterior of the Armory. TRC noted that hexachlorobutadiene does not occur naturally in the environment, and is formed during the processing of other chlorinated compounds.
- Several metals (iron, magnesium, manganese, and sodium) were detected at concentrations that exceeded TOGS Class GA standards in each groundwater sample. TRC concluded that the metals are naturally occurring; therefore, the detections were likely attributable to background soil and bedrock conditions in the area.

- SVOCs were not detected in the groundwater samples, and field indications of petroleum impacts in groundwater were not observed during the investigation.

Soil Samples in the Shooting Ranges

- Twelve of the 18 soil samples collected from 15 locations contained lead concentrations that exceeded the TAGM typical urban background upper range of 500 mg/kg. In general, samples collected from nearer the soil berm or metal backstop in the rifle ranges exhibited higher lead concentrations.
- Eight of the 11 soil samples submitted for Toxicity Characteristic Leaching Procedure (TCLP) analysis for lead contained concentrations that exceeded the Resource Conservation and Recovery Act (RCRA) hazardous waste criterion.

The report stated that the former potential UST area west of the Armory at the present guard booth location may be the former location of a 225-gallon gasoline UST that was reported to be closed and removed from the Site in 1995, based on information provided in the Phase I ESA. Because existing information is insufficient to document the location of the gasoline UST and other USTs associated with historic spills at the Site, TRC recommended that NYSDEC and other regulatory records be researched for additional information regarding the tanks. TRC did not recommend additional soil or groundwater sampling near the former UST locations west of the Armory, unless requested by NYSDEC to close out open spills associated with the USTs; however, NYSDEC's Spill Incidents Database revealed that the only open spill discussed in the Phase I ESA was closed in June 3, 2008. Other open spills have not documented at the Site. TRC also recommended that the lead-impacted soil and deteriorated wooden timber wall in the pistol and rifle ranges be removed and disposed in accordance with appropriate hazardous waste management and disposal regulations.

***Draft Phase II ESI of Kingsbridge Armory,* November 6, 2008, prepared by Langan.**

The objective of this Phase II ESI investigation was to assess environmental remediation costs associated with proposed site development, including lead contamination in the former pistol and rifle ranges, historical fill material below the sub-cellar and western parking area, and former USTs in the western parking area and off-site maintenance area northwest of the Armory. The investigation consisted of the following:

- Geophysical survey in the western exterior parking area;
- 17 direct-push soil borings from which 23 soil samples were collected in the western parking area, sub-cellar, and pistol and rifle ranges.
- 10 test pits from which 10 soil samples were collected in the sub-cellar; and
- 3 monitoring wells from which 3 groundwater samples were collected in the sub-cellar.

Figure 2 shows the locations of the borings, monitoring wells, and test pits. The findings of the investigation revealed the following:

- The geophysical survey did not identify obvious indications of USTs. Signal interference precluded verification of the potential UST associated with the gasoline fill port discussed in TRC's report.
- Soil underlying the Site consists of historic fill comprised of sand with traces of silt, gravel, brick, and ash. The fill generally extends to depths of 4 ft to 7 ft below the cellar floor slab and about 19 ft below ground surface (bgs) in the western parking area. Weathered rock was encountered at 12 ft to 15 ft below the sub-cellar floor slab. Groundwater was encountered in the monitoring wells at depths of 4 ft to 6 ft below the sub-cellar floor slab.
- Elevated organic vapor concentrations, stained soil, and petroleum odors were observed in two test pits and one boring (MW-3) in the northwest portion of the sub-cellar. The impacted soil was observed at depths of between 2 ft and 12 ft below the floor slab.
- A petroleum odor and an elevated organic vapor reading were detected in soil collected from the 25 ft to 30 ft depth interval in one boring in the western parking area (LG-14).
- In general, soil samples exhibited concentrations of SVOCs and metals typical of historic urban fill and did not indicate a spill at the Site.
- Six of the 17 soil samples collected from the pistol and rifle ranges exhibited Toxicity Characteristic Leaching Procedure (TCLP) lead concentrations indicative of hazardous waste.
- Five VOCs and one SVOC (naphthalene) were detected at concentrations that exceeded the TOGS AWQS in the groundwater sample collected from well MW-3 in the northwest portion of the sub-cellar. Naphthalene was also detected at a concentration exceeding the TOGS AWQS in a groundwater sample collected from the western parking area (LB-16).

The report concluded that groundwater under the northwestern portion of the sub-cellar had been impacted with petroleum. Additional off-site groundwater sampling was recommended to determine whether the two historical USTs on the northern adjoining property were the source of the impacts.

***Supplemental Groundwater Investigation Report*, June 17, 2009, prepared by Langan**

Groundwater sampling was conducted on the National Guard property to evaluate the source of groundwater impacts in the northwestern portion of the sub-cellar in the Armory building. Langan installed a monitoring well (MW-4) south of a former UST and collected groundwater samples from existing monitoring wells (TRC-MW-3 on the National Guard property and MW-3

in the northwest portion of the Armory building). The field observations and analytical results of the investigation did not indicate the presence of an off-site spill associated with the decommissioned USTs on the National Guard property. Concentrations of VOCs and SVOCs in groundwater collected from the northwestern portion of the Armory building appeared to have attenuated to levels below regulatory standards. The locations of the off-site monitoring wells are shown in Figure 2.

2.5 Geology

Based on Langan's 2008 Geotechnical Investigation, the Site is underlain by historic fill material to depths of 7 to 25 ft below the top of pavement, which corresponds to el 125 to 105. Fill extended to a depth of 50 ft below sidewalk grade in a boring LB-1, which is located along the northern exterior of the Armory. The fill consists of brown, coarse- to fine-grained sand with silt, gravel, brick, and rock. Silty sand underlies the fill material at a thickness that varies from 3 to 37 ft. Decomposed rock, which is 2 to 17 ft thick, is located 9 ft to 50 ft below sidewalk grade. Bedrock consisting of grey mica gneiss was encountered at 9 ft to 58 below sidewalk grade ft (el 116 to el 73). According to the Bedrock and Engineering Geologic Maps of Bronx County and Parts of New York and Queens Counties, New York, by Charles A. Baskerville (1992), bedrock at the Site belongs to the Fordham Gneiss geologic unit. Rocks of the Fordham Gneiss are Proterozoic in age, and are typically harder than neighboring units due to the interlocking texture attributable to formation under high-grade (i.e., granulite) metamorphic conditions.

2.6 Hydrogeology

Based on groundwater level readings collected during the geotechnical investigation, Phase II ESI, and Phase II SESI, groundwater elevations generally range from about el 115 on the eastern portion of the Site to el 109 on the western portion of the Site. The depth to groundwater in observation wells that were installed on paved exterior areas at sidewalk grade ranged from 11.6 ft in LB-1 along the northern exterior of the building to 30.4 ft in LB-16 in the parking area near Reservoir Avenue. The depth to groundwater in the interior monitoring wells (MW-1 through MW-9) installed inside the sub-cellar ranged from 3.0 ft in MW-3 on the northwestern portion of the sub-cellar to 10.4 ft in MW-8 on the southwestern portion of the sub-cellar.

Groundwater elevation data indicates that groundwater at the Site flows towards the southwest, which generally conforms to the south-southwest sloping topographic gradient shown on the USGS Central Park, N.Y. Topographic Quadrangle Map, dated 1966 and revised in 1979. Groundwater flow in the fill may be influenced locally by underground structures (e.g., pipes, foundations, and buried structures). Groundwater in this area of New York City is not used as a potable (drinking) water source. The potable water supply is provided by the City of

New York and is derived from surface impoundments in the Croton, Catskill, and Delaware watersheds.

3.0 FIELD INVESTIGATION

Langan implemented the Phase II SESI activities between May 20 and 24, 2013. The scope of work was designed to:

- Investigate areas of potential soil disturbance during proposed development construction;
- Investigate potential impacts attributable to the adjoining National Guard property;
- Collect information and analytical data to facilitate selection of a remedial approach; and,
- Evaluate the need for remedial actions associated with the proposed future use of the Site.

The scope of work for the investigation consisted of:

- A geophysical survey to identify any subsurface anomalies, storage tanks, and utilities;
- Installation of 5 subsurface soil vapor points and collection of 5 soil gas samples and one ambient air (background) sample;
- Collection of 18 soil samples from 9 environmental borings to assess soil conditions and potential health and safety issues regarding soil disturbance during the proposed site renovation; and
- Installation and sampling of 5 temporary groundwater monitoring wells and sampling of 2 existing permanent monitoring wells in order to assess site groundwater conditions;

3.1 Geophysical Survey

On May 14, 2013, NOVA Geophysical & Environmental, Inc. (NOVA) of Douglaston, New York completed geophysical surveys under the supervision of a Langan field engineer. The surveys used ground penetrating radar (GPR), electromagnetic (EM) detectors, and comprehensive subsurface utility (CSUL) locators to locate and identify current and former utility lines, anomalies, underground storage tanks (USTs), subsurface structures, and to clear and mark proposed boring locations at the project Site. Borings were relocated as necessary to avoid subsurface utilities and anomalies.

3.2 Soil Sampling Procedures

On May 20 and 21, 2013, environmental samples were collected from nine borings (MW-5 through MW-10 and LG-19 through LG-21) to assess soil conditions with respect to current and

historic Site usages. The borings were completed by Laurel Environmental Associates, Ltd. (Laurel) of Huntington Station, New York, using Geoprobe 6610DT and 7822DT track-mounted drill rigs. Environmental borings were advanced to depths of 8 to 35 feet bgs. A Langan engineer was on Site during all drilling activities. Soil boring locations are shown on Figure 2.

Soil samples were collected continuously throughout each environmental boring to termination depths with a 2-inch diameter Macro-Core® sampler. Soil samples retrieved from each boring were visually classified for soil type, grain size, and texture. Each soil sample was also inspected for visual and olfactory evidence of contamination and screened for total organic vapors using a photoionization detector (PID) equipped with a 10.6 electron volt (eV) lamp. Soil boring logs are provided in Appendix A.

Two soil samples were collected for laboratory analysis from each boring: one sample from the upper two-foot depth interval and one sample from the depth interval exhibiting the greatest degree of contamination based on field observations. In the event that no contamination was observed, the second sample was collected from the depth interval immediately above the groundwater interface. Soil samples were collected in laboratory-supplied containers and shipped under chain-of-custody protocol to York Analytical, Inc. (York), a New York State Department of Health (NYSDOH) Environmental Laboratory Accreditation Program (ELAP)-certified laboratory in Stamford, Connecticut. Soil samples were analyzed for NYSDEC Part 375 list VOCs with MTBE per EPA Method 8260B (utilizing En Core® collection method), SVOCs per EPA Method 8270C, PCBs per EPA Method 8082, and target analyte list (TAL) metals per EPA Method 6020/7000 Series. The shallow soil samples were also analyzed for pesticides via EPA Method 8081.

3.3 Groundwater Sampling Procedures

In order to assess groundwater conditions at the Site, five borings were completed as temporary groundwater monitoring wells (MW-6 through MW-10). A sixth temporary groundwater monitoring well (MW-5) was planned but could not be installed due to refusal at bedrock encountered above the groundwater table. The wells were installed at depths ranging from approximately 15 to 35 feet bgs (el 106.2 to 104.4). Monitoring wells were constructed with 1-inch inner diameter (ID), threaded flush-joint, polyvinyl chloride (PVC) casings and screens, with 10 feet of 0.02 in slotted screen. Clean sand was used to backfill the area around the screen to approximately 2 feet above the screen. Well Construction Logs are provided in Appendix B.

Following installation, the monitoring wells were developed using a peristaltic pump such that a minimum of three well volumes were purged and the discharge was visibly free of silt or fine sand.

After development, the monitoring wells were purged and sampled using low-flow purging techniques to minimize drawdown. In addition to sampling the five temporary groundwater wells, existing groundwater monitoring wells MW-3 (installed in 2008) and TRC-MW-3 (installed in 2007) were sampled. Sampling for existing monitoring well MW-4 (installed in 2009) was proposed; however, the well was not sampled due to lack of access. Prior to sampling, the monitoring wells were purged using a peristaltic pump and dedicated, disposable polyethylene tubing. During purging, the turbidity, pH, temperature, conductivity, Redox potential, and dissolved oxygen of the groundwater were monitored using a Horiba U-52 Water Quality meter with a flow-through cell. The groundwater was purged until the water quality parameters were stable and the turbidity was below 50 Nephelometric Turbidity Units (NTU). The monitored parameters were recorded on the Well Development and Sampling Logs provided in Appendix C.

After purging the wells, a groundwater sample was collected from each well in laboratory-supplied containers with appropriate preservatives and shipped under chain-of-custody protocol to York. Groundwater samples were analyzed for NYSDEC Part 375 list VOCs with MTBE per EPA Method 8260B, SVOCs per EPA Method 8270C, PCBs per EPA Method 8082, and TAL metals per EPA Method 6020/7000 Series. All groundwater samples except for MW-8 were also analyzed for pesticides via EPA Method 8081.

3.4 Soil Vapor Sampling Procedures

In order to assess soil vapor conditions and evaluate the potential for vapor intrusion at the Site, five soil vapor points (SV-1 though SV-5) were installed (see Figure 2). The soil vapor points were installed by Laurel under the full time supervision of a Langan field engineer. The sampling was conducted in accordance with the October 2006 NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York.

Five indoor sub-slab soil vapor points were installed at a depth of approximately 1 ft bgs. At each sub-slab location, dedicated polyethylene tubing was inserted into each boring. The annulus around the probe/tubing was backfilled with a sand filter and sealed with hydrated bentonite. Soil vapor logs are included as Appendix D.

As a quality assurance/quality control (QA/QC) measure, an inert tracer gas (helium) was introduced into an above-grade sampling chamber to ensure that the soil vapor sampling points

were properly sealed above the target sampling depth thereby preventing sub-surface infiltration of ambient air. The sample chamber was sealed above the sample point with hydrated bentonite. Each soil vapor point was purged using a PID at a rate of 0.5 liters per minutes (L/min) to evacuate a minimum of three tubing volumes prior to sample collection. Soil vapor samples were then collected into laboratory-supplied, batch-certified 6-Liter Summa® canisters that were calibrated for a sampling rate of two hours per sample. The canisters were properly labeled and transported via courier to York following standard chain-of-custody protocols. Samples were analyzed for VOCs via EPA Method TO-15.

One indoor ambient air sample (KIC_AA) sample was collected for QA/QC.

4.0 OBSERVATIONS AND RESULTS

4.1 Geophysical Survey

The geophysical surveys did not identify anomalies consistent with USTs at the Site. Several scattered minor anomalies were observed throughout the surveyed areas and near some of the proposed boring locations. Boring locations were adjusted prior to drilling to avoid subsurface utilities and anomalies.

4.2 Subsurface Observations

Surface cover at the Site is primarily concrete. General sub-surface conditions encountered during the Phase II ESI included:

- Fill material, predominantly consisting of grey and brown to dark brown, fine- to coarse-grained sand with some silt, gravel, brick, concrete, weathered rock, and small rock fragments was identified in the borings through a depth of approximately 6 to 20 ft bgs (el 123.7 to 109.8). The fill layer is underlain by primarily brown fine to coarse sands with some silt and sandy silts. Petroleum-related odors, staining, and PID readings greater than background levels were not observed in any of the borings.

- Bedrock was observed underlying the native silt and sand layer at boring locations MW-5 and LG-20 at depths of approximately 8 ft bgs (el. 111.8) and 27.5 ft bgs (el 110.3), respectively.

- Groundwater was encountered at depths of approximately 9 to 30 ft bgs (el 110.6 to 108.7). Inferred groundwater flow direction is southwest.

4.3 Analytical Results

4.3.1 Soil Sample Results

Soil samples analytical results were compared to the NYSDEC Title 6 of the official compilation of New York Codes, Rules and Regulations (6 NYCRR) Part 375 Unrestricted Use and Restricted Commercial-Use Soil Cleanup Objectives (SCOs). Soil samples analytical detections are summarized in Table 1 and are shown on Figure 3. A complete copy of the laboratory report is included in Appendix E. The following is a summary of detections and exceedances of applicable Unrestricted and Restricted Commercial-Use SCOs:

VOCs

Four VOCs (2-butanone, acetone, bromomethane, and methylene chloride) were detected in one or more soil samples.

No VOCs were detected at concentrations exceeding their respective Unrestricted or Restricted Commercial-Use SCOs in soil samples.

SVOCs

Multiple SVOCs were detected in one or more soil samples; however, SVOCs were detected at concentrations exceeding their respective Unrestricted Use SCOs in only one soil sample (LG-19 [0-2]) collected from 0 to 2 ft bgs in boring LG-19. There were no SVOC detections above the applicable SCOs in the duplicate sample (DUP-1 (052113)) of soil sample LG-19 (0-2). The following SVOCs exceeded their respective Unrestricted Use SCOs:

- Benzo(a)pyrene (1 mg/kg[1]) – 1.04 mg/kg
- Benzo(k)fluoranthene (1 mg/kg) – 1.05 mg/kg
- Indeno(1,2,3-cd)pyrene (0.5 mg/kg) – 0.597 mg/kg

An SVOC was detected at a concentration exceeding its respective Restricted Commercial-Use SVOC in only one soil sample (LG-19 [0-2]) for benzo(a)pyrene at 1.04 mg/kg. There were no SVOC detections above the Restrictive Commerical-Use SCO in the duplicate sample (DUP-1 [052113]) of soil sample LG-19 (0-2).

[1] Part 375 Unrestricted Use SCOs shown in parentheses following analyte name

Metals

Eighteen metals were detected in soil samples collected at the Site, including five metals detected at concentrations exceeding their respective Unrestricted Use SCOs:

- Barium (350 mg/kg) - 558 mg/kg in MW-7 (1-5)
- Copper (50 mg/kg) – 50.1 mg/kg in MW-7 (1-5)
- Chromium (30[1] mg/kg)
    - 31.7 mg/kg in LG-20 (0-2); and
    - 32.9 mg/kg in LG-21 (20-22)
- Lead (63 mg/kg)
    - 134 mg/kg in MW-6 (0-2);
    - 392 mg/kg in MW-7 (1-5);
    - 155 mg/kg in MW-8 (0.5-2.5);
    - 79.5 mg/kg in MW-9 (0-2); and
    - 143 in DUP-1 (052113) (duplicate of sample LG-19 (0-2))
- Nickel (30 mg/kg) – 30.7 mg/kg in MW-10 (1-3)
- Zinc (109 mg/kg) – 112 mg/kg in MW-6 (0-2); 501 mg/kg in MW-7 (1-5); and 203 mg/kg in MW-8 (0.5-2.5)

One metal was detected at a concentration exceeding its Restricted Commercial-Use SCO:

- Barium (400 mg/kg) - 558 mg/kg in MW-7 (1-5)

PCBs

There were no PCB detections in the soil samples.

Pesticides

Only the shallow soil samples from each soil boring were analyzed for pesticides. Pesticides were detected but none exceeded their respective Unrestricted or Restricted Commercial-Use SCOs.

[1] Unrestricted Use SCO criteria (30 mg/kg) is for Trivalent Chromium

4.3.2 Groundwater Results

Groundwater analytical results were compared to NYSDEC Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS) and Guidance Values for Class GA water (drinking water). The analytical results for groundwater are summarized in Table 2 and presented on Figure 4. The table and figure provide results for each compound and highlight the results that are above TOGS AWQS or Guidance Values for drinking water. The analytical results of the groundwater samples are summarized as follows:

VOCs

Bromomethane and methylene chloride were the only VOCs detected in groundwater throughout the Site. Only one VOC, methylene chloride, a common laboratory artifact, was detected at concentrations exceeding its TOGS AWQS or Guidance Value. Methylene Chloride exceedances were detected in all samples including the field blank sample.

SVOCs

Bis(2-ethylhexyl)phthalate was the only SVOCs detected in groundwater throughout the Site, however it did not exceed its respective TOGS AWQS or Guidance Value in any groundwater samples.

Metals

Fifteen metals were detected in groundwater samples. The following is a summary of the three metals that exceeded their respective NYSDEC TOGS Class GA AWQS and GV:

- Iron (300 µg/l)
  - 529 µg/l in MW-6;
  - 4,060 µg/l in MW-7;
  - 1,450 µg/l in the duplicate of sample MW-7

- Manganese (300 µg/l)
  - 352 µg/l in MW-6;
  - 351 µg/l in MW-7;
  - 343 µg/l in the duplicate of sample MW-7;
  - 1,660 µg/l in MW-8;
  - 315 µg/l in MW-9; and
  - 706 µg/l in MW-10

- Sodium (20,000 µg/l)
    - 124,000 µg/l in MW-3;
    - 47,200 µg/l in MW-6;
    - 53,200 µg/l in MW-7;
    - 53,800 µg/l in the duplicate of sample MW-7;
    - 59,500 µg/l in MW-8;
    - 71,400 µg/l in MW-9;
    - 332,000 µg/l in MW-10; and
    - 326,000 µg/l in TRC-MW-3.

Pesticides and PCBs

Pesticides and PCBs were not detected in any of the groundwater samples.

4.3.3 Soil Vapor Results

New York State currently does not have standards, criteria, or guidance values for concentrations of VOCs in sub-surface soil vapor. Therefore, analytical results for soil vapor samples were compared to:

- NYSDOH Air Guideline Values (AGVs) for methylene chloride, tetrachloroethene (PCE), and trichloroethene (TCE);
- NYSDOH Decision Matrix 1 and 2 that address PCE, TCE, 1,1,1-trichloroethane (1,1,1-TCA), and carbon tetrachloride; and
- Background levels of VOCs in indoor air presented in Appendix C of the NYSDOH Guidance, including Upper Fence Limit Indoor Air Values from;
    - "Table C-1 NYSDOH 2003: Study of Volatile Organic Chemicals in Air of Fuel Oil Heated Homes,"
    - 90th Percentile indoor air values from "Table C-2 - EPA 2001: Building Assessment and Survey Evaluation (BASE) Database, SUMMA canister method", and
    - the 95th Percentile Indoor Air Values from "Table C-5, Health Effects Institute (HEI) 2005: Relationship of Indoor, Outdoor and Personal Air".

The analytical results for soil vapor and ambient air are summarized in Table 3 and shown in Figure 5. The following VOCs were reported at concentrations that exceeded the range of specified background concentrations:

- n-Hexane
- Trichloroethylene (TCE)
- Tetrachloroethylene (PCE)

NYSDOH AGV Results

- Methylene chloride and PCE were not detected at concentrations exceeding NYSDOH AGV in any of the sub-slab soil vapor samples.
- TCE was detected at a concentration of 400 micrograms per cubic meter (µg/m³) in sample SV-4, exceeding the NYSDOH AGV of 5 µg/m³.

The soil vapor sample results were also compared to Decision Matrices 1 and 2 in the NYSDOH Soil Vapor Intrusion Guidance. The matrices address the compounds tetrachloroethene (PCE), trichloroethene (TCE), 1,1,1-trichloroethane (1,1,1-TCA), and carbon tetrachloride.

Decision Matrix 1 (TCE and carbon tetrachloride)

- The indoor air TCE concentration was 0.18 µg/m^3.
    - TCE was detected at a concentration of 400 µg/m^3 at SV-4, exceeding its AGV of 5 µg/m^3. Matrix 1 recommends mitigation for sub-slab TCE concentrations >250 µg/m^3 for all indoor air TCE concentrations.
    - TCE was not detected in samples taken from SV-1, SV-2, SV-3, and SV-5. Matrix 1 recommends no further action for sub-slab TCE concentrations <50 µg/m^3 for indoor air TCE concentrations <0.25 µg/m^3.
- The indoor air carbon tetrachloride concentration was 0.47 µg/m^3.
    - Carbon tetrachloride was not detected in any of the sub-slab soil vapor samples. Matrix 1 recommends reasonable and practical actions to identify sources and reduce exposures for indoor air concentrations between 0.25 and 1 µg/m^3.

Decision Matrix 2 (PCE and 1,1,1-TCA)

- The indoor air PCE concentration was 3.7 µg/m^3.
    - PCE was detected at concentrations less than 100 µg/m^3 at all soil vapor points. For indoor air PCE concentrations between 3 and 30 µg/m^3 and sub-slab PCE concentrations less than 100 µg/m^3, Matrix 2 recommends reasonable and practical actions to identify sources and reduce exposures.
- 1,1,1-TCA concentration was not detected in the indoor air sample.
    - 1,1,1-TCA was not detected in any of the soil vapor samples. Matrix 2 recommends no further action for indoor air concentrations less than 3 µg/m^3 and sub-slab concentrations less than 100 µg/m^3.

5.0 CONCLUSIONS

Based on the findings of the Phase II SESI, we conclude the following:

- The subsurface at the Site consists of historic fill material underlain by silt and sand above bedrock, which is also consistent with prior investigations. The historic fill layer is predominantly comprised of fine to coarse sand with some silt, gravel, weathered rock, and rock fragments. Historic fill was generally observed up to approximately 20 ft bgs at the outdoor sidewalk-grade boring locations and 8 ft bgs at the indoor basement boring locations.

- No evidence of petroleum impacts was observed based on visual, olfactory, and PID readings.

- Groundwater was encountered between approximately 3 and 30 ft bgs (el 112 to 109) at the Site, with a presumed southwesterly flow.

- Anomalies consistent with utilities, building remnant structures, and urban fill were detected on Site; however, no geophysical anomalies indicative of USTs were identified in surveyed areas.

- Site soils were found to contain SVOCs and metals that are consistent with typical historic fill concentrations.

- Site groundwater was found to contain one VOC and three metals at concentrations above NYSDEC TOGS Class GA AWQS and GVs. However, the presence of methylene chloride, the VOC, is likely not representative of actual groundwater conditions since it is a common laboratory contaminate and it was detected at a similar concentration in the field blank sample, which indicates that the laboratory-supplied deionized water used to perform the field blank may have been contaminated.

- Three VOCs were detected above NYSDOH background levels in soil gas, including PCE and TCE. TCE was detected at a concentration above its AGV of 5 $\mu g/m^3$ in one of the soil vapor samples. TCE was not detected in soil and groundwater samples collected during the SESI.

6.0 LIMITATIONS

This Phase II SESI report was prepared expressly for Kingsbridge National Ice Center ("the Client") for the Site (29 West Kingsbridge Ave. in the Bronx, New York) in support of the

proposed development at the Site. Langan cannot assume responsibility for the use of this Report for any property other than the specific site addressed in this report, or by any third party without specific written authorization from Langan.

The conclusions, opinions, and recommendations provided in this report are based on subsurface conditions ascertained from the analysis of a limited number of samples and from environmental reports prepared by other professionals that were provided by "the Client". Recommendations provided are contingent upon one another and no recommendation should be followed independent of the others. Actual conditions encountered may differ substantially from those presented herein and should be brought to our attention whereby we may determine how such changes may affect our conclusions, opinions, and recommendations.

TABLES

Table 1
Soil Sample VOCs, SVOCs, Metals, Pesticides, and PCBs Detections Summary
Phase II Supplemental Environmental Site Investigation
29 West Kingsbridge Road, Bronx, NY
Langan Project No. 170246501

Sample ID Lab ID Sampling Date DilutionFactor	NYSDEC Part 375 Restricted Use Comercial SCO	NYSDEC Part 375 Unrestricted Use SCO	MW-5 (0-2) 13E0744-01 5/21/2013 5		MW-5 (6-8) 13E0744-02 5/21/2013 1		MW-6 (0-2) 13E0711-05 5/20/2013 5		MW-6 (9-11) 13E0711-06 5/20/2013 1		MW-7 (1-5) 13E0711-01 5/20/2013 5		MW-7 (7-9) 13E0711-02 5/20/2013 1		MW-8 (0.5-2.5) 13E0711-07 5/20/2013 5		MW-8 (7.5-9.5) 13E0711-08 5/20/2013 1		MW-9 (0-2) 13E0711-03 5/20/2013 5		MW-9 (6-8) 13E0711-04 5/20/2013 1	
VOC (mg/kg)																						
2-Butanone	500	0.12	0.0027	U	0.0027	U	0.003	U	0.0027	U	0.0035	U	0.0024	U	0.0029	U	0.0027	U	0.0026	U	0.0026	U
Acetone	500	0.05	0.0029	J,B	0.004	J,B	0.003	U	0.0027	U	0.0035	U	0.0024	U	0.0029	U	0.0027	U	0.0026	U	0.0026	U
Bromomethane	~	~	0.0027	U	0.0027	U	0.003	U	0.011		0.019		0.0024	U	0.012		0.0059		0.0026	U	0.0065	
Methylene chloride	500	0.05	0.0063	J	0.0054	J	0.014		0.017		0.022		0.011		0.016		0.016		0.014		0.015	
SVOC (mg/kg)																						
Acenaphthene	500	20	0.0706	U	0.067	U	0.0971	U	0.107	U	0.496	U	0.0993	U	0.0971	U	0.107	U	0.0999	U	0.108	U
Anthracene	500	100	0.106	U	0.101	U	0.146	U	0.161	U	0.749	U	0.15	U	0.146	U	0.161	U	0.151	U	0.163	U
Benzo(a)anthracene	5.6	1	0.0729	U	0.0693	U	0.243	J	0.11	U	0.554	J,D	0.103	U	0.57		0.11	U	0.361		0.112	U
Benzo(a)pyrene	1	1	0.0772	U	0.0733	U	0.326		0.117	U	0.729	J,D	0.109	U	0.689		0.117	U	0.447		0.118	U
Benzo(b)fluoranthene	5.6	1	0.163	U	0.155	U	0.225	U	0.247	U	*1.15*	U	0.23	U	0.505		0.247	U	0.421		0.251	U
Benzo(g,h,i)perylene	500	100	0.0648	U	0.0615	U	0.0891	U	0.0977	U	0.455	U	0.091	U	0.0896	J	0.0977	U	0.105	J	0.0993	U
Benzo(k)fluoranthene	56	0.8	0.195	U	0.185	U	0.29		0.294	U	*1.37*	U	0.274	U	0.617		0.294	U	0.369		0.299	U
Chrysene	56	1	0.0897	U	0.0852	U	0.312		0.135	U	0.655	J,D	0.126	U	0.633		0.135	U	0.404		0.138	U
Fluoranthene	500	100	0.114	U	0.109	U	0.362		0.172	U	1.04	J,D	0.161	U	0.941		0.173	U	0.622		0.175	U
Fluorene	500	30	0.0936	U	0.0889	U	0.129	U	0.141	U	0.658	U	0.132	U	0.129	U	0.141	U	0.132	U	0.144	U
Indeno(1,2,3-cd)pyrene	5.6	0.5	0.0889	U	0.0844	U	0.122	U	0.134	U	*0.625*	U	0.125	U	0.14	J	0.134	U	0.134	J	0.136	U
Phenanthrene	500	100	0.102	U	0.0967	U	0.167	J	0.154	U	0.941	J,D	0.143	U	0.667		0.154	U	0.424		0.156	U
Pyrene	500	100	0.0796	U	0.0755	U	0.486		0.12	U	1.3	J,D	0.112	U	1.2		0.12	U	0.803		0.122	U
Metals (mg/kg)																						
Aluminum	~	~	7490		12300		8150		5460		18700		9940		12700		8380		12200		9140	
Arsenic	16	13	2.33		2.95		3.66		6.06		6.39		2.65		4.65		3.09		3.39		3.99	
Barium	400	350	71.7		69		244		52.1		**558**		143		226		64.9		99.6		53.6	
Cadmium	9.3	2.5	0.117	U	0.111	U	0.107	U	0.118	U	1.17		0.11	U	0.107	U	0.118	U	0.11	U	0.12	U
Calcium	~	~	22100		3100		7170		9570		7470		2980		11200		5190		11200		10800	
Chromium	1500*	30*	20.4		23.4		25.6		13.4		25.1		17		19.7		13.6		25.4		23	
Cobalt	~	~	7.35		9.3		8.14		6.35		16.7		9.04		11.7		6.28		9.93		9.2	
Copper	270	50	16.7		16.5		29.6		12.7		**50.1**		12.9		27.6		9.68		26.7		20.9	
Iron	~	~	13900		22700	E	13900		10800		42500	E	16900		26100	E	17300		24100	E	16300	
Lead	1000	63	4.56		3.06		**134**		4.57		**392**		9.87		**155**		7.88		**79.5**		7.59	
Magnesium	~	~	13300		7840		5180		7160		11700		5410		6690		3000		6270		9030	
Manganese	10000	1600	340		332		210		286		432		215		321		115		267		219	
Nickel	310	30	17.4		15.7		21.4		23.6		24.3		15.8		21.5		16.5		20.9		21.2	
Potassium	~	~	3170		6600		2220		1500		12300		3820		5340		768		3010		2570	
Selenium	1500	3.9	0.585	U	0.753		0.537	U	0.588	U	0.548	U	0.548	U	1.39		0.78		0.552	U	0.598	U
Sodium	~	~	275	B	258	B	284		219		326		188		426		205		339		301	
Vanadium	~	~	23.8		41.2		27.4		18.2		64		36.6		47.9		18.3		36.8		35.3	
Zinc	10000	109	37		42.4		**112**		27.2		**501**		49.3		**203**		37.6		76.2		46.1	
Pesticides (mg/kg)																						
4,4'-DDE	62	0.0033	0.00193	U	NT		0.00266	U	NT		**0.00722**	D	NT		0.00266	U	NT		0.00273	U	NT	
4,4'-DDT	47	0.0033	0.00193	U	NT		0.00266	U	NT		**0.012**	D	NT		0.00266	U	NT		0.00273	U	NT	
PCBs (mg/kg)																						
Total PCBs	1	0.1	ND		ND		ND		ND		ND		ND		ND		ND		ND		ND	
General Chemistry																						
% Solids	~	~	85.4		90		93.2		85		91.2		91.2		93.2		84.9		90.6		83.6	

Notes:
1. Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) title 6 of the official compilation of New York Codes, Rules and Regulations (NYCRR) Part 375 Restricted Use Comercial and Unrestricted Use Soil Cleanup Objectives (SCO).
2. Only compounds with detections are shown in the table.
3. NYSDEC Part 375 Restricted Use Comercial SCO exceedances are highlighted.
4. NYSDEC Part 375 Unrestricted Use SCO exceedances are bolded.
4. Method Detection Limits (MDL) above NYSDEC Part 375 Restricted Use Comercial SCO standards are italicized.
5. VOC = Volatile organic compounds
6. SVOC = Semi-volatile organic compounds
7. PCB = Polychlorinated Biphenyls
8. mg/kg = miligrams per kilogram
9. ~ = this indicates that no regulatory limit has been established for this analyte
10. * = NYSDEC Part 375 Restricted Use Comercial SCO and Unrestricted Use SCO criteria (1500 and 30 mg/kg) are for Trivalent Chromium
11. ND = Not Detected
12. NT = Not Tested

Qualifiers:
B = Analyte found in the analysis batch blank
D = Result is from an analysis that required a dilution
E = Estimated value
J = Analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U = Analyte not detected at or above the level indicated

Table 1
Soil Sample VOCs, SVOCs, Metals, Pesticides, and PCBs Detections Summary
Phase II Supplemental Environmental Site Investigation
29 West Kingsbridge Road, Bronx, NY
Langan Project No. 170246501

Sample ID Lab ID Sampling Date DilutionFactor	NYSDEC Part 375 Restricted Use Comercial SCO	NYSDEC Part 375 Unrestricted Use SCO	MW-10 (1-3) 13E0744-07 5/21/2013 5		MW-10 (32-34) 13E0744-08 5/21/2013 1		LG-19 (0-2) 13E0744-09 5/21/2013 5		DUP-1 (052113) 13E0744-11 5/21/2013 5		LG-19 (26-28) 13E0744-10 5/21/2013 1		LG-20 (0-2) 13E0744-03 5/21/2013 5		LG-20 (22-24) 13E0744-04 5/21/2013 1		LG-21 (0-2) 13E0744-05 5/21/2013 5		LG-21 (20-22) 13E0744-06 5/21/2013 1	
VOC (mg/kg)																				
2-Butanone	500	0.12	0.0025	U	0.0031	U	0.0037	U	0.0031	U	0.0029	U	0.0027	U	0.0026	U	0.0025	U	0.0034	J
Acetone	500	0.05	0.0033	J,B	0.0044	J,B	0.0093	J	0.004	J,B	0.0041	J,B	0.0027	U	0.0042	J,B	0.0025	U	0.023	B
Bromomethane	~	~	0.0025	U	0.0031	U	0.0037	U	0.0031	U	0.0029	U	0.0027	U	0.0026	U	0.0025	U	0.0026	U
Methylene chloride	500	0.05	0.005	J	0.0088	J	0.0086	J,B	0.0055	J	0.0059	J	0.0058	J	0.0058	J	0.0046	J	0.0059	J
SVOC (mg/kg)																				
Acenaphthene	500	20	0.0674	U	0.0698	U	0.338	U	0.0699	U	0.0682	U	0.0663	U	0.0699	U	0.151	J	0.0692	U
Anthracene	500	100	0.102	U	0.105	U	0.509	U	0.105	U	0.103	U	0.1	U	0.11	J	0.296		0.104	U
Benzo(a)anthracene	5.6	1	0.23		0.0721	U	0.972	D	0.105	J	0.0705	U	0.0685	U	0.159	J	0.577		0.0777	J
Benzo(a)pyrene	1	1	0.238		0.0763	U	**1.04**	D	0.102	J	0.0746	U	0.0725	U	0.158	J	0.431		0.12	J
Benzo(b)fluoranthene	5.6	1	0.2		0.162	U	0.858	J,D	0.162	U	0.158	U	0.153	U	0.162	U	0.42		0.16	U
Benzo(g,h,i)perylene	500	100	0.159	J	0.064	U	0.569	J,D	0.0641	U	0.0626	U	0.0608	U	0.0857	J	0.234		0.0738	J
Benzo(k)fluoranthene	56	0.8	0.249		0.193	U	**1.05**	D	0.193	U	0.188	U	0.183	U	0.193	U	0.406		0.191	U
Chrysene	56	1	0.234		0.0887	U	0.988	D	0.102	J	0.0867	U	0.0843	U	0.155	J	0.505		0.088	U
Fluoranthene	500	100	0.404		0.113	U	1.55	D	0.204		0.11	U	0.107	U	0.39		1.04		0.112	U
Fluorene	500	30	0.0894	U	0.0925	U	0.448	U	0.0927	U	0.0905	U	0.0879	U	0.0927	U	0.129	J	0.0918	U
Indeno(1,2,3-cd)pyrene	5.6	0.5	0.167	J	0.0879	U	**0.597**	J,D	0.0881	U	0.086	U	0.0835	U	0.0881	U	0.267		0.0872	U
Phenanthrene	500	100	0.144	J	0.101	U	0.6	J,D	0.107	J	0.0984	U	0.0956	U	0.39		0.847		0.0998	U
Pyrene	500	100	0.28		0.0787	U	1.22	D	0.143	J	0.0769	U	0.0747	U	0.244		0.707		0.0956	J
Metals (mg/kg)																				
Aluminum	~	~	12100		4770		11100		14500		7220		14800		12600		15100		14200	
Arsenic	16	13	2.92		1.33		3.07		4.6		1.22		3.14		5.72		4.3		2.8	
Barium	400	350	72.4		41.1		110		89.6		45.2		81.6		102		81.5		140	
Cadmium	9.3	2.5	0.112	U	0.116	U	0.112	U	0.116	U	0.113	U	0.11	U	0.116	U	0.116	U	0.115	U
Calcium	~	~	5190		1200		9460		1940		1170		1120		1700		1590		2300	
Chromium	1500*	30*	27.4		11.5		26.6		28.7		12.2		31.7		25.9		28		32.9	
Cobalt	~	~	10.4		5.36		9.2		9.43		6.37		9.83		11.6		9.4		12.2	
Copper	270	50	30.7		10.9		35.4		18.6		10.8		22.1		26.8		17		35	
Iron	~	~	18700		10700		18200		20200		10200		20100		17500		20200		20500	
Lead	1000	63	35.8		3.85		58.7		**143**		3.74		6.44		22.5		51.7		8.18	
Magnesium	~	~	7530		2170		6320		5040		1950		4670		4120		5370		7080	
Manganese	10000	1600	307		188		292		443		202		417		223		380		274	
Nickel	310	30	**30.7**		13.6		23.6		25.2		14		25.1		21.5		23.2		25.4	
Potassium	~	~	2000		1150		2560		1040		1000		1720		1220		1010		2600	
Selenium	1500	3.9	0.559	U	0.78		0.559	U	1.25		0.671		0.549	U	0.872		0.578	U	1.07	
Sodium	~	~	195	B	320	B	203	B	123	B	183	B	151	B	249	B	144	B	274	B
Vanadium	~	~	34.1		15		32.6		31.8		14.5		33.5		29.4		31.6		51.9	
Zinc	10000	109	77.4		22.8		90		84.2		23.1		43.1		57.5		57.6		59.9	
Pesticides (mg/kg)																				
4,4'-DDE	62	0.0033	0.00184	U	NT		0.00185	U	0.00191	U	NT		0.00181	U	NT		0.00191	U	NT	
4,4'-DDT	47	0.0033	0.00184	U	NT		0.00185	U	0.00191	U	NT		0.00181	U	NT		0.00191	U	NT	
PCBs (mg/kg)																				
Total PCBs	1	0.1	ND		ND		ND		ND		ND		ND		ND		ND		ND	
General Chemistry																				
% Solids	~	~	89.5		86.5		89.4		86.3		88.4		91		86.3		86.5		87.1	

Notes:
1. Soil sample analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) title 6 of the official compilation of New York Codes, Rules and Regulations (NYCRR) Part 375 Restricted Use Comercial and Unrestricted Use Soil Cleanup Objectives (SCO).
2. Only compounds with detections are shown in the table.
3. NYSDEC Part 375 Restricted Use Comercial SCO exceedances are highlighted.
4. NYSDEC Part 375 Unrestricted Use SCO exceedances are bolded.
4. Method Detection Limits (MDL) above NYSDEC Part 375 Restricted Use Comercial SCO standards are italicized.
5. VOC = Volatile organic compounds
6. SVOC = Semi-volatile organic compounds
7. PCB = Polychlorinated Biphenyls
8. mg/kg = miligrams per kilogram
9. ~ = this indicates that no regulatory limit has been established for this analyte
10. * = NYSDEC Part 375 Restricted Use Comercial SCO and Unrestricted Use SCO criteria (1500 and 30 mg/kg) are for Trivalent Chromium
11. ND = Not Detected
12. NT = Not Tested

Qualifiers:
B = Analyte found in the analysis batch blank
D = Result is from an analysis that required a dilution
E = Estimated value
J = Analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U = Analyte not detected at or above the level indicated

Table 2
Groundwater Sample VOCs, SVOCs, Metals, Pesticides, and PCBs Detections Summary
Phase II Supplemental Environmental Site Investigation
29 West Kingsbridge Road, Bronx, NY
Langan Project No. 170246501

Location Sample ID Lab Sample ID Sampling Date	NYSDEC TOGS Standards and Guidance Values - GA	MW-3 MW-3_052313 13E0868-06 5/23/2013	MW-6 MW-6_052313 13E0868-04 5/23/2013	MW-7 MW-7_052313 13E0868-05 5/23/2013	DUP-1 DUP-1_052313 13E0868-02 5/23/2013	MW-8 MW-8_052313 13E0868-01 5/23/2013	MW-9 MW-9_052313 13E0868-03 5/23/2013	MW-10 MW-10_052313 13E0868-07 5/23/2013	TRC-MW-3 TRC-MW-3_052413 13E0868-08 5/24/2013	FB FB_052413 13E0868-09 5/24/2013
VOC (µg/l)										
Bromomethane	5	2.5 U	2.5 U	2.5 U	2.5 U	2.6 J	2.5 U	2.5 U	2.5 U	2.5 U
Methylene chloride	5	**7.2**	**6.2**	**7.3**	**5.6**	**7.6**	**6.3**	**5.9**	**6.1**	**7.2**
SVOC (µg/l)										
Bis(2-ethylhexyl)phthalate	5	0.64 J	0.943 J	0.571 U	0.789 J	0.861 J	0.496 U	0.628 U	0.523 U	0.496 U
Pesticides (µg/l)										
Pesticides	~	ND	ND	ND	ND	NT	ND	ND	ND	ND
PCB (µg/l)										
Total PCBs	0.09	ND	ND	ND	ND	ND	ND	ND	ND	ND
Metals (µg/l)										
Aluminum	~	10 U	259	1180	411	96	78	46	32	10 U
Barium	1000	255	79	165	143	90	72	66	60	2 U
Calcium	~	111000	87000	110000	110000	137000	103000	87700	82000	295
Chromium	50	2 U	2 U	2 J	2 U	2 U	2 U	2 U	2 U	2 U
Cobalt	~	2 J	2 J	2 J	2 U	2 U	2 U	2 U	2 U	2 U
Copper	200	12	2 J	10	8	2 J	2 U	2 J	2 J	2 U
Iron	300	52	**529**	**4060**	**1450**	144	211	22	77	10 J
Lead	25	4	2 J	4	3	2 J	3	7	4	4
Magnesium	35000	17000	26700	21000	20500	25500	25800	22300	21600	10 J
Manganese	300	293	**352**	**351**	**343**	**1660**	**315**	**706**	44	2 U
Nickel	100	7	6	1 J	1 J	1 J	1 J	6	1 U	1 U
Potassium	~	11000	13200	11500	11000	13100	12100	8280	7890	26 J
Sodium	20000	**124000**	**47200**	**53200**	**53800**	**59500**	**71400**	**332000**	**326000**	214
Vanadium	~	2 U	2 U	2 J	2 J	2 U	2 U	2 U	2 U	2 U
Zinc	2000	50	2 J	25	2 J	29	21	39	20	36

Notes:
1. Groundwater analytical results are compared to the New York State Department of Environmental Conservation (NYSDEC) Technical and Operational Guidance Series (TOGS) 1.1.1 Ambient Water Quality Standards (AWQS) and Guidance Values for Drinking Water (class GA).
2. Only compounds with detections are shown in the table.
3. NYSDEC TOGS 1.1.1 AWQS and Guidance Values exceedances are highlighted and bolded.
4. Method Detection Limits (MDL) above NYSDEC TOGS 1.1.1 AWQS and Guidance Values are italicized.
5. VOCs = Volatile organic compounds
6. SVOCs = Semi-volatile organic compounds
7. PCBs = Polychlorinated Biphenyls
8. µg/l = micrograms per liter
9. ~ = this indicates that no regulatory limit has been established for this analyte
10. ND = Not Detected
11. NT = Not Tested

Qualifiers:
J=analyte detected at or above the MDL (method detection limit) but below the RL (Reporting Limit) - data is estimated
U=analyte not detected at or above the level indicated

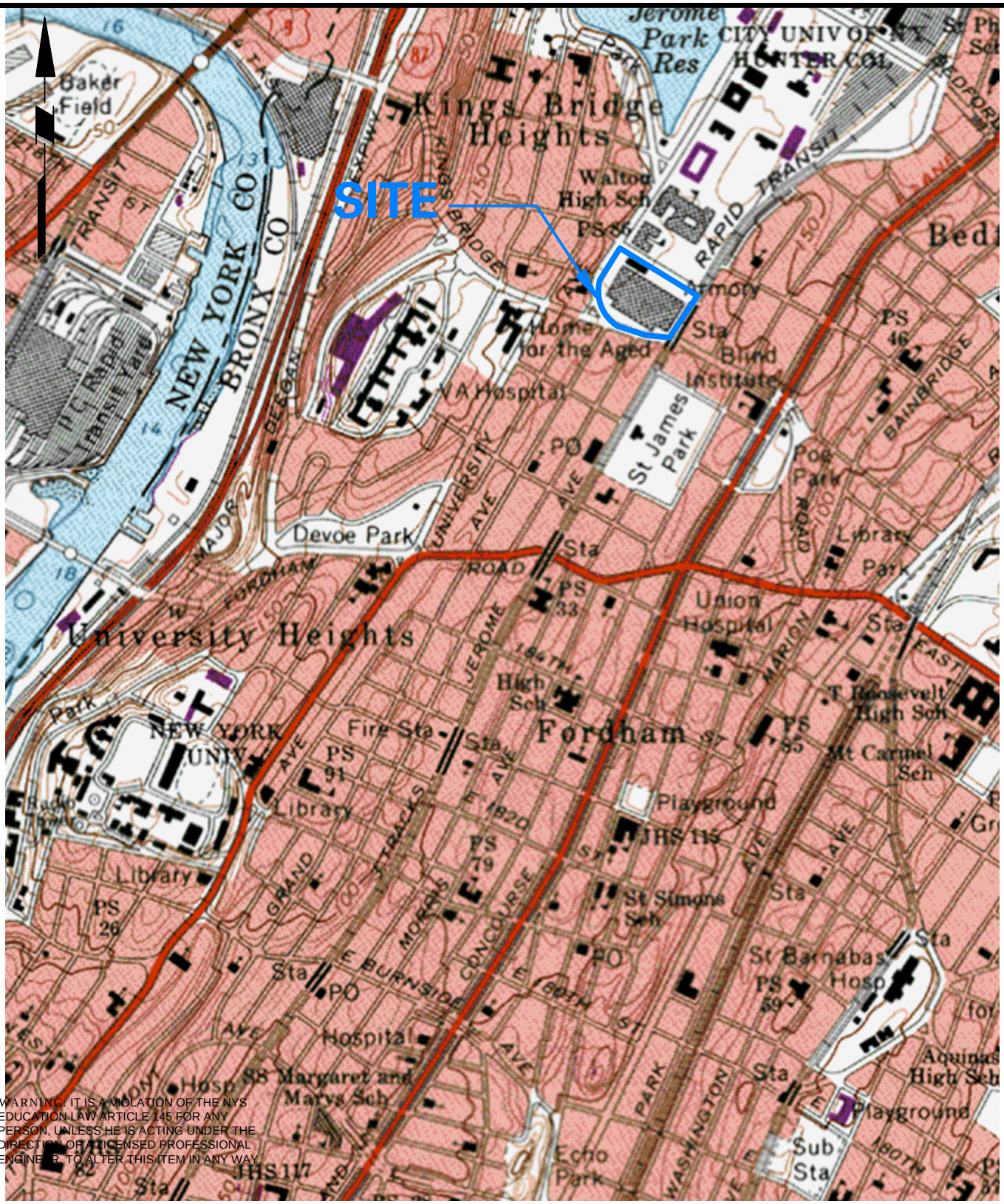
Table 3
Summary of Detected VOCs in Soil Vapor and Ambient Air Samples
29 West Kingsbridge Road
The Bronx, New York
Langan Project No. 170246501

Sample ID Lab ID Sampling Date DilutionFactor	NYSDOH AGV	NYSDOH 2003 FUEL OIL INDOOR AIR UPPER FENCE VALUE	EPA 2001 BASE DATABASE: 90 PERCENTILE	HEI 2005 95 PERCENTILE INDOOR AIR	SV-1 13E0710-01 5/20/2013 18.74		SV-2 13E0710-02 5/20/2013 20.16		SV-3 13E0710-03 5/20/2013 20.83		SV-4 13E0710-04 5/20/2013 17.38		SV-5 13E0710-05 5/20/2013 21		KIC_AA 13E0710-06 5/20/2013 0.66666	
VOCs (µg/m³)																
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	~	~	~	~	15	U	16	U	16	U	14	U	16	U	0.62	D
1,2,4-Trimethylbenzene	~	9.8	91	~	9.4	U	10	U	10	U	8.7	U	10	U	1.2	D
1,3,5-Trimethylbenzene	~	3.9	3.7	~	9.4	U	10	U	10	U	8.7	U	10	U	0.37	D
1,4-Dichlorobenzene	~	1.2	5.5	~	11	U	12	U	13	U	11	U	13	U	0.41	D
2-Butanone	~	16	12	~	5.6	U	6.0	U	6.2	U	5.2	U	6.3	U	1.4	D
Acetone	~	115	98.9	45.8	58	D	39	D	89	D	30	D	49	D	16	D
Benzene	~	13	9.4	10	6.1	U	6.6	U	6.8	U	5.6	U	6.8	U	2.0	D
Carbon tetrachloride	~	1.3	1.3	1.1	6.0	U	6.4	U	6.7	U	5.6	U	6.7	U	0.47	D
Cyclohexane	~	6.3	~	~	6.6	U	7.1	U	7.3	U	6.1	U	7.4	U	1.3	D
Dichlorodifluoromethane	~	10	6.8	~	9.4	U	10	U	10	U	8.7	U	11	U	2.7	D
Ethyl Benzene	~	6.4	5.7	7.62	8.3	U	8.9	U	9.2	U	7.7	U	9.3	U	1.7	D
Isopropanol	~	~	~	~	4.7	U	5.0	U	5.2	U	4.3	U	5.2	U	2.7	D
Methylene chloride	60	16	10	75	13	D	10	D	8.8	D	8.6	D	8.9	D	12	D
n-Heptane	~	~	~	~	47	D	45	D	38	D	43	D	51	D	0.28	U
n-Hexane	~	14	10.2	~	**120**	D	**110**	D	**110**	D	**120**	D	**130**	D	**24**	D
o-Xylene	~	7.1	7.9	7.24	8.3	U	8.9	U	9.2	U	7.7	U	9.3	U	1.8	D
p- & m- Xylenes	~	11	22.2	22.2	17	U	18	U	18	U	15	U	19	U	5.6	D
Tetrachloroethylene	100	2.5	15.9	6.01	13	U	14	U	14	U	**18**	D	14	U	3.7	D
Toluene	~	57	43	39.8	15	D	14	D	8.0	U	12	D	13	D	27	D
Trichloroethylene	5	0.5	4.2	1.36	5.1	U	5.5	U	5.7	U	**400**	D	5.7	U	0.18	U
Trichlorofluoromethane (Freon 11)	~	12	18.1	~	11	U	12	U	12	U	9.9	U	12	U	1.9	D

Notes:
1. Soil vapor samples analytical results are compared to the New York State Department of Health (NYSDOH) Air Guideline Value (AGV), the NYSDOH Fuel Oil 2003 Upper Fence Value, the US Environmental Protection Agency (EPA) Building Assessment and Survey Evaluation (BASE) Database 90th Percentile Indoor Air, and the Health Effects Institute (HEI) 2005 95th Percentile Indoor Air.
2. Only compounds with detections are shown in table.
3. NYSDOH AGV exceedances are highligted and bolded.
4. Results above all three specified background levels are bolded.
5. VOCs = Volatile Organic Compounds
6. µg/m^3 = micrograms per cubic meter
7. ~ = This indicates that no regulatory limit has been established for this analyte.

Qualifiers:
U = Analyte not detected at or above the level indicated
D = Result is from an analysis that required a dilution

FIGURES



WARNING: IT IS A VIOLATION OF THE NYS EDUCATION LAW ARTICLE 145 FOR ANY PERSON, UNLESS HE IS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL ENGINEER, TO ALTER THIS ITEM IN ANY WAY.

BASE MAP OBTAINED FROM THE UNITED STATES GEOLOGICAL SURVEY (USGS), TOPOGRAPHIC MAPS, CENTRAL PARK, NY QUADRANGLE, DATED 1979, AND WEEHAWKEN, NJ, NY QUADRANGLE, DATED 1967 AND REVISED 1981.

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KINGSBRIDGE ARMORY

BLOCK No. 3247, LOT No. 2

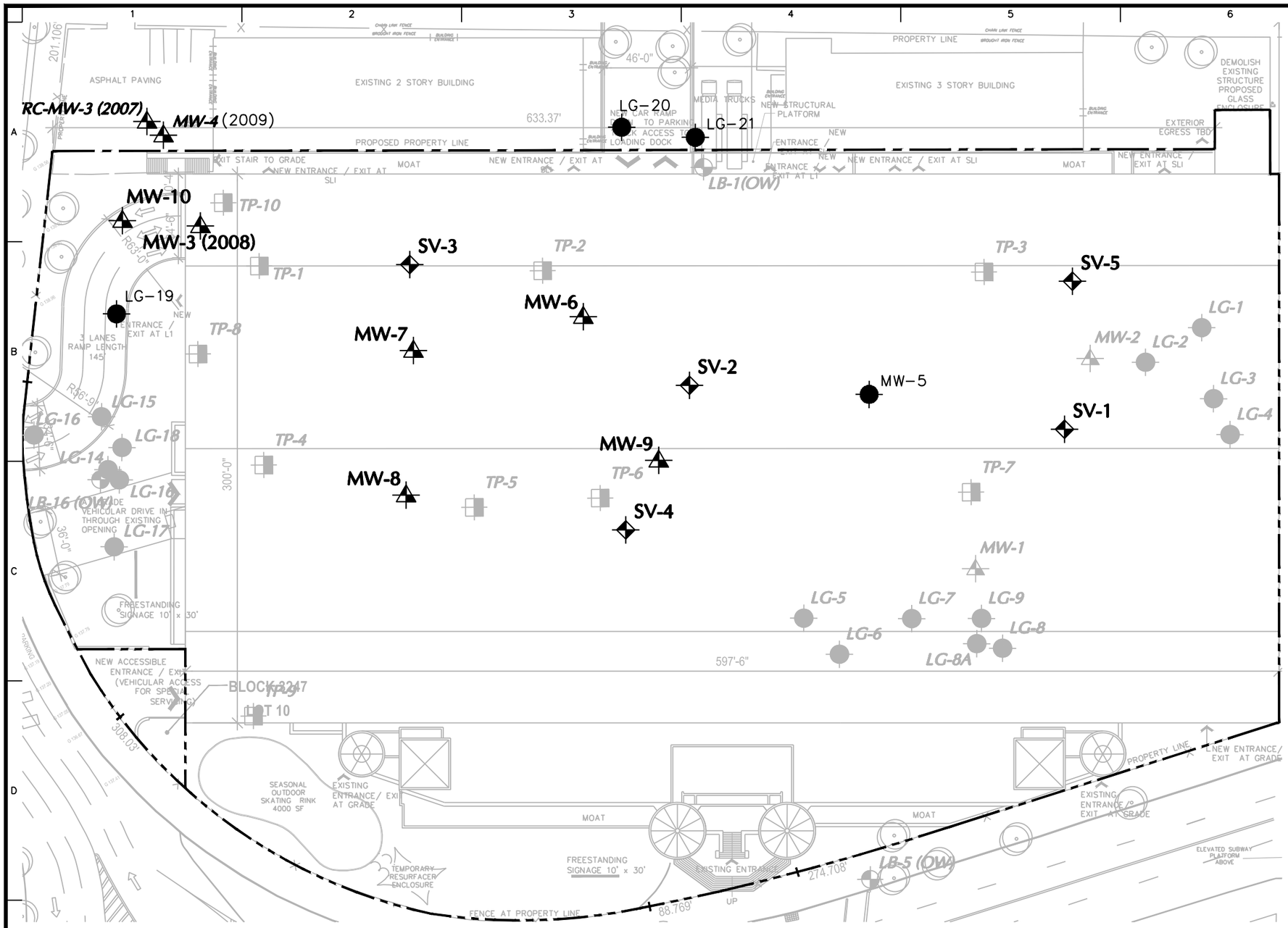
BRONX NEW YORK

SITE LOCATION MAP

Project No.	170246501
Date	JUNE 4, 2013
Scale	NTS
Drawn By	PM
Drawing No.	1

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REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

LEGEND

- SITE BOUNDARY
- LG-19 — BORING LOCATION
- MW-5 — TEMPORARY MONITORING WELL/ BORING LOCATION
- SV-1 — SOIL VAPOR SAMPLING POINT
- LB-1(OW) — 2008 OBSERVATION WELL
- LG-5 — 2008 GEOPROBE BORING
- MW-2 — 2008 / 2009 MONITORING WELL
- TP-6 — 2008 TEST PIT

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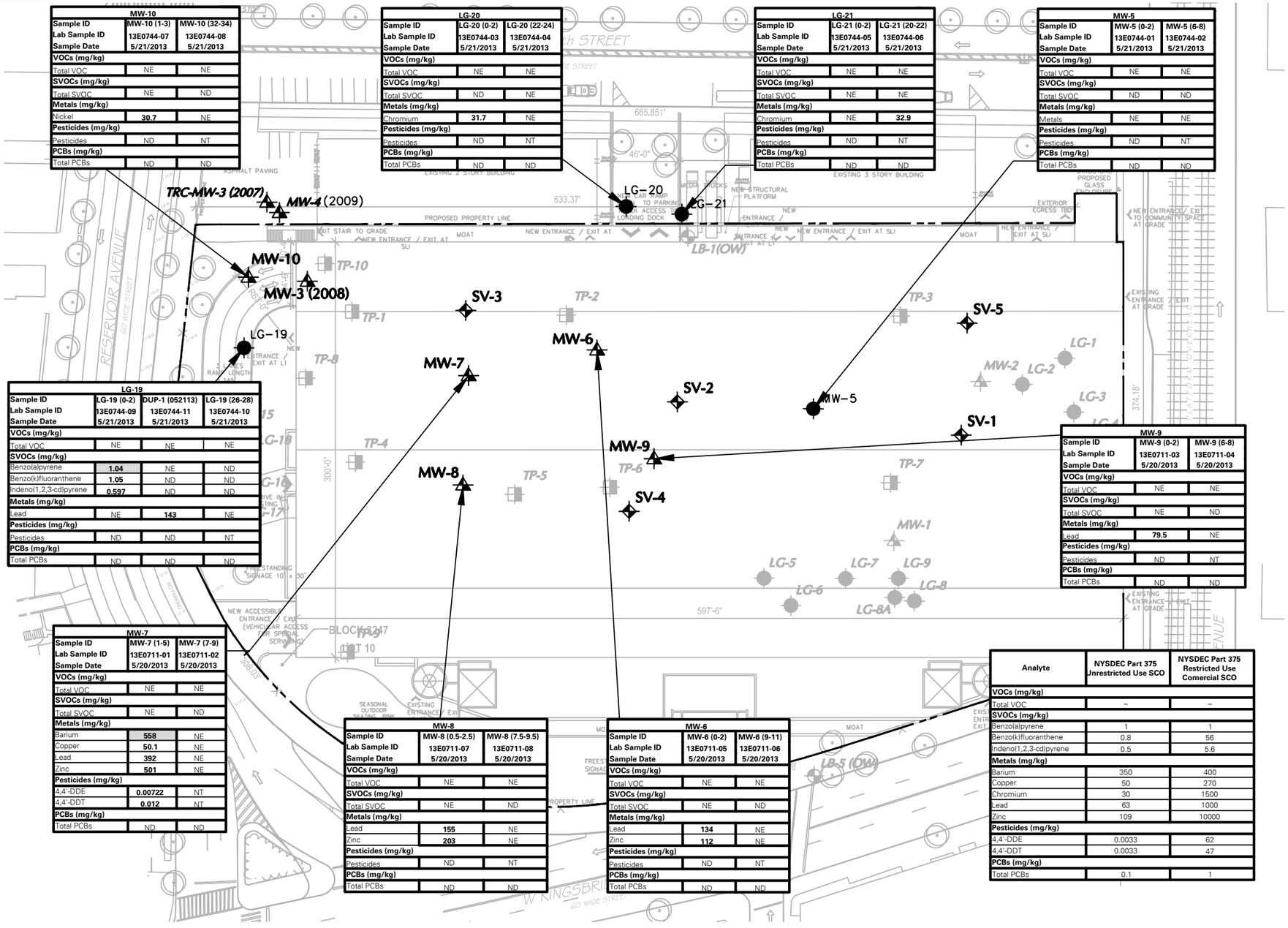
Project
KINGSBRIDGE ARMORY
BLOCK No. 3247, LOT No. 2
BRONX NEW YORK

Drawing Title
BORING AND MONITORING WELL LOCATION PLAN

Project No. 170246501	Drawing No. 2
Date MAY 28, 2013	
Scale 1" = 60'	
Drawn By PM	
Submission Date	

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MW-10		
Sample ID	MW-10 (1-3)	MW-10 (32-34)
Lab Sample ID	13E0744-07	13E0744-08
Sample Date	5/21/2013	5/21/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	NE	ND
Metals (mg/kg)		
Nickel	**30.7**	NE
Pesticides (mg/kg)		
Pesticides	ND	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

LG-20		
Sample ID	LG-20 (0-2)	LG-20 (22-24)
Lab Sample ID	13E0744-03	13E0744-04
Sample Date	5/21/2013	5/21/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	ND	NE
Metals (mg/kg)		
Chromium	**31.7**	NE
Pesticides (mg/kg)		
Pesticides	ND	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

LG-21		
Sample ID	LG-21 (0-2)	LG-21 (20-22)
Lab Sample ID	13E0744-05	13E0744-06
Sample Date	5/21/2013	5/21/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	NE	NE
Metals (mg/kg)		
Chromium	NE	**32.9**
Pesticides (mg/kg)		
Pesticides	ND	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

MW-5		
Sample ID	MW-5 (0-2)	MW-5 (6-8)
Lab Sample ID	13E0744-01	13E0744-02
Sample Date	5/21/2013	5/21/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	ND	ND
Metals (mg/kg)		
Metals	NE	NE
Pesticides (mg/kg)		
Pesticides	ND	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

LG-19			
Sample ID	LG-19 (0-2)	DUP-1 (052113)	LG-19 (26-28)
Lab Sample ID	13E0744-09	13E0744-11	13E0744-10
Sample Date	5/21/2013	5/21/2013	5/21/2013
VOCs (mg/kg)			
Total VOC	NE	NE	NE
SVOCs (mg/kg)			
Benzo(a)pyrene	**1.04**	NE	ND
Benzo(k)fluoranthene	**1.05**	ND	ND
Indeno(1,2,3-cd)pyrene	**0.597**	ND	ND
Metals (mg/kg)			
Lead	NE	**143**	NE
Pesticides (mg/kg)			
Pesticides	ND	ND	NT
PCBs (mg/kg)			
Total PCBs	ND	ND	ND

MW-9		
Sample ID	MW-9 (0-2)	MW-9 (6-8)
Lab Sample ID	13E0711-03	13E0711-04
Sample Date	5/20/2013	5/20/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	NE	ND
Metals (mg/kg)		
Lead	**79.5**	NE
Pesticides (mg/kg)		
Pesticides	ND	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

MW-7		
Sample ID	MW-7 (1-5)	MW-7 (7-9)
Lab Sample ID	13E0711-01	13E0711-02
Sample Date	5/20/2013	5/20/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	NE	ND
Metals (mg/kg)		
Barium	**558**	NE
Copper	**50.1**	NE
Lead	**392**	NE
Zinc	**501**	NE
Pesticides (mg/kg)		
4,4'-DDE	**0.00722**	NT
4,4'-DDT	**0.012**	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

MW-8		
Sample ID	MW-8 (0.5-2.5)	MW-8 (7.5-9.5)
Lab Sample ID	13E0711-07	13E0711-08
Sample Date	5/20/2013	5/20/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	NE	ND
Metals (mg/kg)		
Lead	**155**	NE
Zinc	**203**	NE
Pesticides (mg/kg)		
Pesticides	ND	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

MW-6		
Sample ID	MW-6 (0-2)	MW-6 (9-11)
Lab Sample ID	13E0711-05	13E0711-06
Sample Date	5/20/2013	5/20/2013
VOCs (mg/kg)		
Total VOC	NE	NE
SVOCs (mg/kg)		
Total SVOC	NE	ND
Metals (mg/kg)		
Lead	**134**	NE
Zinc	**112**	NE
Pesticides (mg/kg)		
Pesticides	ND	NT
PCBs (mg/kg)		
Total PCBs	ND	ND

Analyte	NYSDEC Part 375 Unrestricted Use SCO	NYSDEC Part 375 Restricted Use Comercial SCO
VOCs (mg/kg)		
Total VOC	~	~
SVOCs (mg/kg)		
Benzo(a)pyrene	1	1
Benzo(k)fluoranthene	0.8	56
Indeno(1,2,3-cd)pyrene	0.5	5.6
Metals (mg/kg)		
Barium	350	400
Copper	50	270
Chromium	30	1500
Lead	63	1000
Zinc	109	10000
Pesticides (mg/kg)		
4,4'-DDE	0.0033	62
4,4'-DDT	0.0033	47
PCBs (mg/kg)		
Total PCBs	0.1	1

LEGEND

- SITE BOUNDARY
- LG-19 — BORING LOCATION
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- LB-1(OW) — 2008 OBSERVATION WELL
- LG-5 — 2008 GEOPROBE BORING
- MW-2 — 2008 / 2009 MONITORING WELL
- TP-6 — 2008 TEST PIT

NOTES:

1. SOIL SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NYSDEC TITLE 6 OF THE OFFICIAL COMPILATION OF NYCRR PART 375 UNRESTRICTED USE SOIL CLEANUP OBJECTIVES (SCO) AND RESTRICTED USE COMERCIAL SCO.
2. NYSDEC PART 375 UNRESTRICTED USE SCO EXCEEDANCES ARE BOLDED.
3. NYSDEC PART 375 RESTRICTED USE COMERCIAL SCO EXCEEDANCES ARE HIGHLIGHTED.
4. VOCs = VOLATILE ORGANIC COMPOUNDS
5. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
6. PCBs = POLYCHLORINATED BIPHENYLS
7. mg/kg = MILLIGRAM PER KILOGRAM
8. ~ = THIS INDICATES THAT NO REGULATORY LIMIT HAS BEEN ESTABLISHED FOR THIS ANALYTE
9. ND = COMPOUNDS NOT DETECTED
10. NE = COMPOUNDS DID NOT EXCEED THEIR RESPECTIVE NYSDEC PART 375 UNRESTRICTED USE SCO
11. NT = NOT TESTED
12. DUP-1 (052113) IS A DUPLICATE SAMPLE OF LG-19 (0-2)

REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

80 0 40 80
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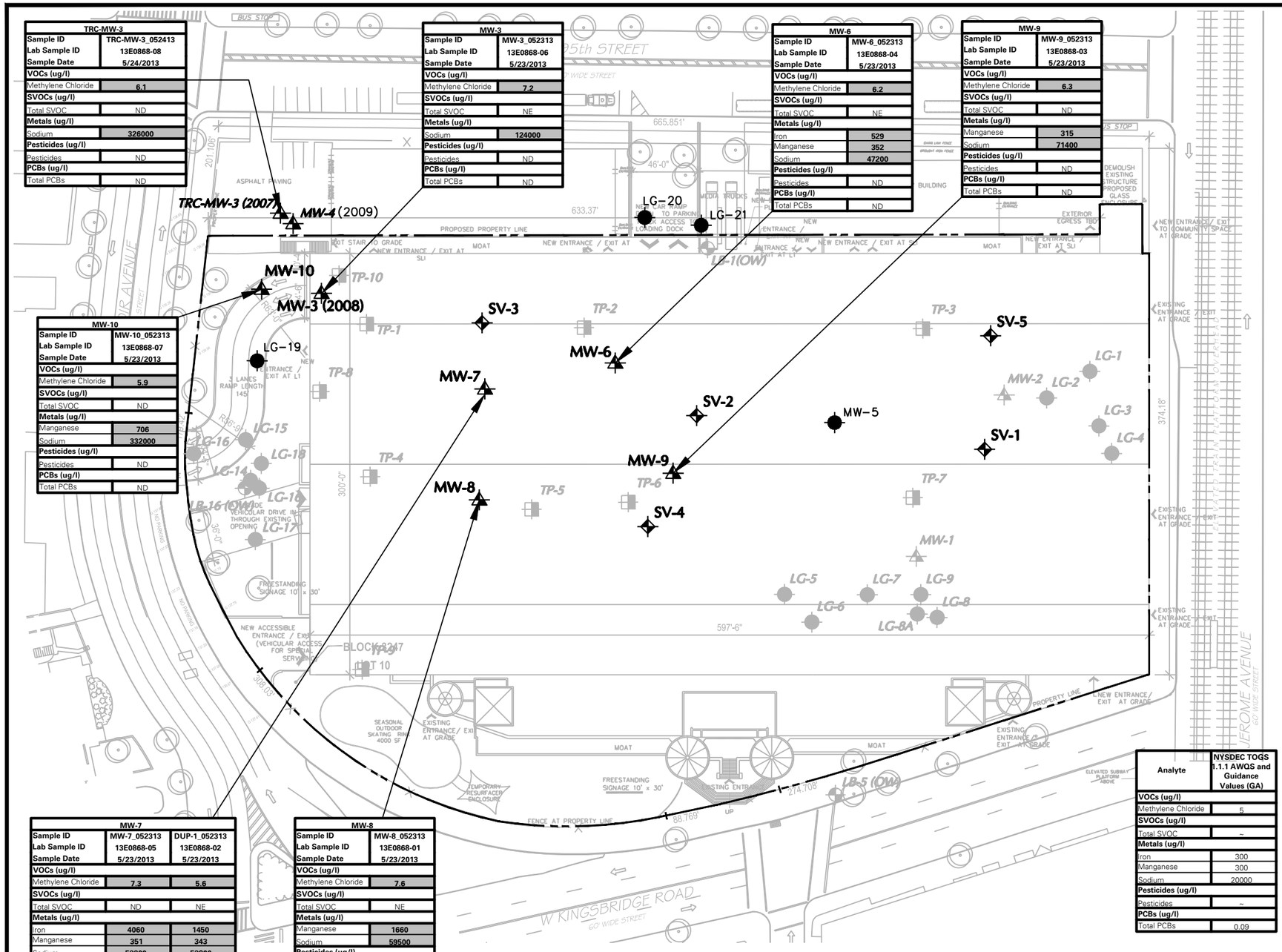
Project
KINGSBRIDGE ARMORY
BLOCK No. 3247, LOT No. 2
BRONX NEW YORK

Drawing Title
SOIL SAMPLE LOCATIONS AND RESULTS MAP

Project No. 170246501	Drawing No. 3
Date MAY 30, 2013	
Scale 1" = 80'	
Drawn By PM	
Submission Date	

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REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

LEGEND

- SITE BOUNDARY
- LG-19 — BORING LOCATION
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- LB-1(OW) — 2008 OBSERVATION WELL
- LG-5 — 2008 GEOPROBE BORING
- MW-2 — 2008 / 2009 MONITORING WELL
- TP-6 — 2008 TEST PIT

NOTES:

1. GROUNDWATER SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) TECHNICAL AND OPERATIONAL GUIDANCE SERIES (TOGS) 1.1.1 AMBIENT WATER QUALITY STANDARDS (AWQS) AND GUIDANCE VALUES FOR DRINKING WATER (CLASS GA).
2. ONLY DETECTIONS ARE SHOWN.
3. NYSDEC TOGS 1.1.1 AWQS AND GUIDANCE VALUES EXCEEDANCES ARE HIGHLIGHTED AND BOLDED.
4. VOCs = VOLATILE ORGANIC COMPOUNDS
5. SVOCs = SEMIVOLATILE ORGANIC COMPOUNDS
6. PCBs = POLYCHLORINATED BIPHENYLS
7. ug/l = MICROGRAMS PER LITER
8. ~ = THIS INDICATES THAT NO REGULATORY LIMIT HAS BEEN ESTABLISHED FOR THIS ANALYTE
9. ND = COMPOUNDS NOT DETECTED
10. NE = COMPOUNDS DID NOT EXCEED THEIR RESPECTIVE NYSDEC TOGS 1.1.1 AWQS AND GUIDANCE VALUES
11. NT = NOT TESTED
12. DUP-1_052313 IS A DUPLICATE SAMPLE OF MW-7_052313

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Project
KINGSBRIDGE ARMORY
BLOCK No. 3247, LOT No. 2
BRONX NEW YORK

Drawing Title
GROUNDWATER SAMPLE LOCATIONS AND RESULTS MAP

Project No. 170246501	Drawing No. 4
Date JUNE 2, 2013	
Scale 1" = 80'	
Drawn By MB	
Submission Date	

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SV-3	
Sample ID	SV-3
Lab Sample ID	13E0710-03
Sample Date	5/20/2013
VOCs (ug/m^3)	
Total VOCs	NE

SV-2	
Sample ID	SV-2
Lab Sample ID	13E0710-02
Sample Date	5/20/2013
VOCs (ug/m^3)	
Total VOCs	NE

SV-5	
Sample ID	SV-5
Lab Sample ID	13E0710-05
Sample Date	5/20/2013
VOCs (ug/m^3)	
Total VOCs	NE

SV-4	
Sample ID	SV-4
Lab Sample ID	13E0710-04
Sample Date	5/20/2013
VOCs (ug/m^3)	
Trichloroethylene	400

SV-1	
Sample ID	SV-1
Lab Sample ID	13E0710-01
Sample Date	5/20/2013
VOCs (ug/m^3)	
Total VOCs	NE

KIC_AA	
Sample ID	KIC_AA
Lab Sample ID	13E0710-06
Sample Date	5/20/2013
VOCs (ug/m^3)	
Total VOCs	NE

LEGEND

- SITE BOUNDARY
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- LB-1(OW) — 2008 OBSERVATION WELL
- LG-5 — 2008 GEOPROBE BORING
- MW-2 — 2008 / 2009 MONITORING WELL
- TP-6 — 2008 TEST PIT

NOTES:

1. SOIL VAPOR SAMPLE ANALYTICAL RESULTS ARE COMPARED TO THE NEW YORK STATE DEPARTMENT OF HEALTH (NYSDOH) AIR GUIDANCE VALUE (AGV).
2. ONLY DETECTIONS ARE SHOWN.
3. NYSDOH AGV EXCEEDANCES ARE HIGHLIGHTED AND BOLDED.
4. KIC_AA = AMBIENT AIR SAMPLE
5. VOCs = VOLATILE ORGANIC COMPOUNDS
6. ug/m^3 = MICROGRAMS PER CUBIC METER
7. NE = COMPOUNDS DID NOT EXCEED THEIR RESPECTIVE NYSDOH AGV

Analyte	NYSDOH AGV
VOCs (ug/m^3)	
Trichloroethylene	5

REFERENCE:
BASE MAP FROM 2013 CONCEPTUAL SITE PLAN BY BBB ARCHITECTS

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Project
KINGSBRIDGE ARMORY
BLOCK No. 3247, LOT No. 2
BRONX NEW YORK

Drawing Title
SOIL VAPOR SAMPLE LOCATIONS AND RESULTS MAP

Project No.	Drawing No.
170246501	5
Date: JUNE 4, 2013	
Scale: 1" = 80'	
Drawn By: MB	
Submission Date	

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APPENDIX A

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Log of Boring **LG-19** Sheet 1 of 2

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 139.7 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/21/13 — Date Finished: 5/21/13
Drilling Equipment: Geoprobe 6610DT	Completion Depth: 35 ft — Rock Depth: N/A
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 — Undisturbed — Core
Casing Diameter (in): 2" — Casing Depth (ft): 5'	Water Level (ft.): First ▽ 28 — Completion ▼ — 24 HR. ▼
Casing Hammer: Steel — Weight (lbs) — Drop (in)	Drilling Foreman: Steve Bitetto
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer — Weight (lbs) — Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+139.7									
	+139.5	2" concrete slab								1250 - Begin Drilling
		0-3" - pulverized concrete 3-8" - dk brown f-c sand, some gravel; trace coal and weathered rock; dry [FILL] 8-33" - brown f-c sand with trace silt, gravel, weathered rock; dry [FILL]	0.0	0	S-1	MACROCORE	33		10 20 30 40	1306 - Take Sample LG-19 (0-2) VOC/SVOC/Metals/ Pesticides/PCBs
			0.0	1						
			0.0	2						
			0.0	3						
			0.0	4						
			0.0	5	S-2	MACROCORE	23			
			0.0	6						
			0.0	7						
			0.0	8						
			0.0	9						
			0.0	10	S-3	MACROCORE	27			
			0.0	11						
			0.0	12						
			0.0	13						
			0.0	14						
			0.0	15						
	+123.7		0.0	16	S-4	MACROCORE	32			
		9-32" - reddish brown m-c sand, trace silt and weathered rock; dry	0.0	17						
			0.0	18						
			0.0	19						
			0.0	20						

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Log of Boring **LG-19** Sheet 2 of 2

Project	Project No.
Kingsbridge Armory	170246501
Location	**Elevation and Datum**
29 West Kingsbridge Rd. The Bronx, NY	139.7 feet above msl

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+117.7		0.0	20						
			0.0	21						
		lt brown and grey sandy silt, trace weathered rock and rock fragments; dry	0.0	22	S-5	MACROCORE	29			
			0.0	23						
			0.0	24						
	+114.7		0.0	25						
		0-20" lt brown m-c sand with some weathered rock; dry	0.0	26						1320 - Take Sample LG-19 (26-28 VOC/SVOC/Metals/PCBs
			0.0	27						
		20-48" - reddish-brown coarse sand; wet ▽	0.0	28	S-6	MACROCORE	48			
			0.0	29						
			0.0	30						
		0-42" - reddish brown coarse sand; saturated	0.0	31						
			0.0	32						
			0.0	33	S-7	MACROCORE	42			
			0.0	34						
	+104.7		0.0	35						End of Boring at 35 ft bgs
				36						
				37						
				38						
				39						
				40						
				41						
				42						
				43						
				44						
				45						

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Log of Boring **LG-20** Sheet 1 of 2

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 137.8 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/21/13 — Date Finished: 5/21/13
Drilling Equipment: Geoprobe 7822DT	Completion Depth: 27.5 ft — Rock Depth: 27.5 ft
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 — Undisturbed — Core
Casing Diameter (in): 2" — Casing Depth (ft): 5'	Water Level (ft.): First ▽ 23 — Completion ▼ — 24 HR. ▼
Casing Hammer: Steel — Weight (lbs) — Drop (in)	Drilling Foreman: Kevin Kegel
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer — Weight (lbs) — Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+137.8	0-10" - dk brown f-c sand with trace silt, gravel, grass, roots, wood; moist [topsoil]	0.0	0						1000 - Begin Drilling
	+136.3	10-38" - brown f-m sand with some silt; trace gravel and weathered rock; dry [FILL]	0.0	1						
			0.0	2	S-1	MACROCORE	42			1149 - Take Sample LG-20 (0-2) VOC/SVOC/Metals/ Pesticides/PCBs
			0.0	3						
		38-42", 0-14" - rock fragments and weathered rock with some brown m-f sand; dry [FILL]	0.0	4						
			0.0	5						
			0.0	6						
			0.0	7	S-2	MACROCORE	14			
			0.0	8						
			0.0	9						
		0-9" - weathered rock with some brown m-f sand; dry [FILL]	0.0	10						
			0.0	11						
			0.0	12	S-3	MACROCORE	9			
			0.0	13						
			0.0	14						
		0-10" - weathered rock and rock fragments; dry [FILL]	0.0	15						
			0.0	16						
			0.0	17	S-4	MACROCORE	22			
		10-22" - brown f-c sand with some weathered rock and rock fragments; dry [FILL]	0.0	18						
			0.0	19						
	+117.8		0.0	20						

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Log of Boring **LG-20** Sheet 2 of 2

Project	Project No.
Kingsbridge Armory	170246501
Location	**Elevation and Datum**
29 West Kingsbridge Rd. The Bronx, NY	137.8 feet above msl

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+112.8	0-17" - brown and lt gray sandy silt with trace weatherd rock and rock fragments; wet	0.0	20	S-5	MACROCORE	17			1201 - Take Sample LG-20 (22-24) VOC/SVOC/Metals/PCBs
			0.0	21						
			0.0	22						
			0.0	23						
			0.0	24						
	+110.3	0-17" - dk grey f-c sand with trace silt and weathered rock; saturated	0.0	25	S-6	MACROCORE	17			
			0.0	26						
			0.0	27						End of Boring at 27.5 ft bgs - Refusal at bedrock
				28						
				29						
				30						
				31						
				32						
				33						
				34						
				35						
				36						
				37						
				38						
				39						
				40						
				41						
				42						
				43						
				44						
				45						

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Log of Boring **LG-21** Sheet 1 of 2

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 137.8 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/21/13 / Date Finished: 5/21/13
Drilling Equipment: Geoprobe 6610DT	Completion Depth: 30 ft / Rock Depth: N/A
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 3 / Undisturbed / Core
Casing Diameter (in): 2" / Casing Depth (ft): 5'	Water Level (ft.): First ▽ 22 / Completion / 24 HR.
Casing Hammer: Steel / Weight (lbs) / Drop (in)	Drilling Foreman: Steve Bitetto
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer / Weight (lbs) / Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+137.8	0-8" - dk brown m-f sand with trace roots, silt, and gravel; moist (topsoil)	0.0	0						0930 - Begin Drilling
	+136.3	8-35" - lt brown silty sand with trace gravel, rock fragments, and weathered rock; dry [FILL]	0.0	1						
			0.0	2	S-1	MACROCORE	35			1055 - Take Sample LG-21 (0-2) VOC/SVOC/Metals/ Pesticides/PCBs
			0.0	3						1105 - Take Sample DUP-1 (052113) VOC/SVOC/Metals/ Pesticides/PCBs
			0.0	4						
		0-16" - lt brown m-f sand, with some coal; trace weathered rock, glass, and brick; dry [FILL]	0.0	5						
			0.0	6						
		16-26" - lt brown f-c sand with some weathered rock and rock fragments; dry [FILL]	0.0	7	S-2	MACROCORE	38			
			0.0	8						
		26-38" - brown m-f saand with some silt; trace rock fragments, weathered rock, and brick; dry [FILL]	0.0	9						
		0-14" - brown c-f sand with some silt; trace rock fragments, weathered rock, coal, and brick; dry [FILL]	0.0	10						
			0.0	11						
		14-33" - brown m-c sand with some silt, trace rock fragments and weathered rock; dry [FILL]	0.0	12	S-3	MACROCORE	33			
			0.0	13						
			0.0	14						
		0-22" - lt brown f-c sand and gray silt with some weathered rock; trace rock fragments; dry	0.0	15						
			0.0	16						
			0.0	17	S-4	MACROCORE	40			
	+119.8		0.0	18						
		22-40" - lt brown m-f sand with some weathered rock; trace silt; dry	0.0	19						
			0.0	20						

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Log of Boring **LG-21** Sheet 2 of 2

Project	Project No.
Kingsbridge Armory	170246501
Location	**Elevation and Datum**
29 West Kingsbridge Rd. The Bronx, NY	137.8 feet above msl

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+116.8	8-43" - grayish brown sandy silt; trace weathered rock; wet	0.0	20						1125 - Take Sample LG-21 (20-22) VOC/SVOC/Metals/PCBs
			0.0	21						
			0.0	22	S-5	MACROCORE	46			
			0.0	23						
			0.0	24						
	+113.3	43-46", 0-6" - dk gray coarse sand and silt; moist (organic odor)	0.0	25						
			0.0	26						
	+111.8	6-33" - brown m-c sand with some silt; trace weathered rock; moist	0.0	27	S-6	MACROCORE	33			
			0.0	28						
			0.0	29						
	+107.8		0.0	30						Endo of Boring at 30 ft bgs
				31						
				32						
				33						
				34						
				35						
				36						
				37						
				38						
				39						
				40						
				41						
				42						
				43						
				44						
				45						

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Log of Boring **MW-10** Sheet 1 of 2

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 139.1 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/21/13 / Date Finished: 5/21/13
Drilling Equipment: Geoprobe 7822DT	Completion Depth: 35 ft / Rock Depth: N/A
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 / Undisturbed / Core
Casing Diameter (in): 2" / Casing Depth (ft): 5'	Water Level (ft.): First ▽ 30 / Completion ▼ / 24 HR. ▼
Casing Hammer: Steel / Weight (lbs) / Drop (in)	Drilling Foreman: Kevin Kegel
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer / Weight (lbs) / Drop (in)	

MATERIAL SYMBOL	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+139.1									
	+138.9	2" concrete slab								
		0-6" - pulverized concrete 6-27" - brown m-f sand with trace silt, gravel, and weathered rock; dry [FILL]	0.0	0						1245 - Begin Drilling
			0.0	1						
			0.0	2	S-1	MACROCORE	27			1333 - Take Sample MW-10 (1-3) VOC/SVOC/Metals/ Pesticides/PCBs
			0.0	3						
			0.0	4						
			0.0	5						
			0.0	6						
			0.0	7	S-2	MACROCORE	17			
			0.0	8						
			0.0	9						
			0.0	10						
			0.0	11						
			0.0	12	S-3	MACROCORE	15			
			0.0	13						
			0.0	14						
		0-16" - dk gray and lt brown m-c sand with some weathered rock and rock fragments; dry [FILL]	0.0	15						
			0.0	16						
			0.0	17	S-4	MACROCORE	24			
	+121.1		0.0	18						
		16-24" - lt brown fine sand with some silt	0.0	19						
			0.0	20						

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Log of Boring **MW-10** Sheet 2 of 2

Project	Project No.
Kingsbridge Armory	170246501
Location	**Elevation and Datum**
29 West Kingsbridge Rd. The Bronx, NY	139.1 feet above msl

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+114.1	No Recovery	0.0	20	S-5	MACROCORE	16		10 20 30 40	
			0.0	21						
			0.0	22						
			0.0	23						
			0.0	24						
			0.0	25						
			0.0	26	S-6	MACROCORE	0			
			0.0	27						
			0.0	28						
			0.0	29						
	+109.1	0-20" - reddish brown coarse sand; saturated ▽	0.0	30						
			0.0	31						1355 - Take Sample MW-10 (32-34) VOC/SVOC/Metals/PCBs
			0.0	32						
	+106.6	20-40" - reddish-brown sandy silt	0.0	33	S-7	MACROCORE	40			
			0.0	34						
	+104.1		0.0	35						End of Boring at 35 ft bgs
				36						
				37						
				38						
				39						
				40						
				41						
				42						
				43						
				44						
				45						

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Log of Boring **MW-5** Sheet 1 of 1

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 119.8 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/21/13 / Date Finished: 5/21/13
Drilling Equipment: Geoprobe 7822DT	Completion Depth: 8 ft / Rock Depth: 8 ft
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 / Undisturbed / Core
Casing Diameter (in): 2" / Casing Depth (ft): 5'	Water Level (ft.): First N/A / Completion / 24 HR.
Casing Hammer: Steel / Weight (lbs) / Drop (in)	Drilling Foreman: Kevin Kegel
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer / Weight (lbs) / Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40
	+119.8			0					
	+119.5	4" Concrete Slab	0.0						
		0-7" - Concrete 7-25" - brown m-f sand with some silt and gravel; trace weathered rock and rock fragments; dry [FILL]	0.0	1					
			0.0	2	S-1	MACROCORE	25		
			0.0	3					
			0.0	4					
		0-8" - brown m-f sand with some silt and gravel; trace weathered rock and rock fragments; dry [FILL]	0.0	5					
	+113.8	8-23" - orange-brown m-f sand with trace gravel, silt, and decomposed rock; dry 23-24" - decomposed rock	0.0	6	S-2	MACROCORE	24		
	+111.8		0.0	7					
				8					
				9					
				10					
				11					
				12					
				13					
				14					
				15					
				16					
				17					
				18					
				19					
				20					

Remarks
(Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)

0730 - Begin Drilling
0745 - Refusal Encountered at 8 ft bgs, groundwater not observed
Refusal encountered at 8 ft bgs at 9 locations between 4 and 40 ft North and West of original location
No well set. Take samples from original boring location.
1025 - Take Sample MW-5 (0-2)
VOC/SVOC/Metals/ Pesticides/PCBs

1035 - Take Sample MW-5 (6-8)
VOC/SVOC/Metals/PCBs

End of Boring @ 8 ft bgs - refusal at bedrock (~111 ft above msl)

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Log of Boring **MW-6** Sheet 1 of 1

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 119.8 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/20/13 — Date Finished: 5/20/13
Drilling Equipment: Geoprobe 7822DT	Completion Depth: 15 ft — Rock Depth: N/A
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 — Undisturbed — Core
Casing Diameter (in): 2" — Casing Depth (ft): 5'	Water Level (ft.): First ▽ 10 — Completion ▼ — 24 HR. ▼
Casing Hammer: Steel — Weight (lbs) — Drop (in)	Drilling Foreman: Steve Bitetto
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer — Weight (lbs) — Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft)	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+119.8			0						
	+119.5	4" Concrete Slab								
		0-28" - dark brown m-c sand and gravel with some rock fragments; trace weathered rock, ash, brick; dry [FILL]	0.0	1	S-1	MACROCORE	28			1415 - Begin Drilling
			0.0	2						1500 - Take Sample MW-6 (0-2) VOC/SVOC/Metals/ Pesticides/PCBs
			0.0	3						
			0.0	4						
			0.0	5						
		0-18" - grey weathered rock and rock fragments with some brown f-m sand; dry [FILL]	0.0	6	S-2	MACROCORE	22			
			0.0	7						
	+111.8		0.0	8						
		18-22" - lt brown m-c sand with trace silt; moist	0.0	9						
		▽ 0-24" - brown m-f sand with trace silt; wet	0.0	10						1518 - Take Sample MW-6 (9-11) VOC/SVOC/Metals//PCBs
			0.0	11	S-3	MACROCORE	30			
			0.0	12						
			0.0	13						
	+105.8		0.0	14						
		24-30" - lt brown f-m silty sand								
	+104.8			15						End of Boring at 15 ft bgs
				16						
				17						
				18						
				19						
				20						

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Log of Boring **MW-7** Sheet 1 of 1

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 119.5 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/20/13 — Date Finished: 5/20/13
Drilling Equipment: Geoprobe 7822DT	Completion Depth: 15 ft — Rock Depth: N/A
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 — Undisturbed — Core
Casing Diameter (in): 2" — Casing Depth (ft): 5'	Water Level (ft.): First ▽ 9 — Completion ▼ — 24 HR. ▼
Casing Hammer: Steel — Weight (lbs) — Drop (in)	Drilling Foreman: Steve Bitetto
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer — Weight (lbs) — Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+119.5			0						
	+119.1	5" Concrete Slab								
		0-2" - pulverized concrete 2-12" - brown f-c sand with some gravel; trace rock fragments and ash; dry [FILL]	0.2	1	S-1	MACROCORE	12			1230 - Begin Drilling
			0.2	2						1325 - Take Sample MW-7 (1-5) VOC/SVOC/Metals/ Pesticides/PCBs
			0.2	3						
			0.2	4						
			0.2	5						
		0-6" - brown f-m sand with trace weathered rock; dry [FILL]	0.0							
	+113.5	6-18" - lt brown f-m sand with some silt; trace rock fragments; moist	0.2	6	S-2	MACROCORE	24			
			0.0	7						1335 - Take Sample MW-7 (7-9) VOC/SVOC/Metals/PCBs
		18-24" - lt brown f-c sand with some silt; saturated ▽	0.0	8						
			0.0	9						
	+109.5	0-18" - orange-brown m-c sand with trace gravel and silt; saturated	0.1	10	S-3	MACROCORE	30			
			0.0	11						
			0.1	12						
	+106.5	18-24" - lt brown sandy silt	0.1	13						
	+105.5	24-30" - lt brown silt	0.0	14						
	+104.5			15						End of Boring at 15 ft bgs
				16						
				17						
				18						
				19						
				20						

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Log of Boring **MW-8** Sheet 1 of 1

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 119.7 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/20/13 — Date Finished: 5/20/13
Drilling Equipment: Geoprobe 7822DT	Completion Depth: 15 ft — Rock Depth: N/A
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 — Undisturbed — Core
Casing Diameter (in): 2" — Casing Depth (ft): 5'	Water Level (ft.): First ▽ 9.5 — Completion — 24 HR.
Casing Hammer: Steel — Weight (lbs) — Drop (in)	Drilling Foreman: Steve Bitetto
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer — Weight (lbs) — Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+119.7			0						
	+119.3	5" Concrete Slab								
		0-28" - brown m-f sand with some gravel; trace weathered rock and rock fragments; dry [FILL]	0.0	1	S-1	MACROCORE	28			1330 - Begin Drilling
			0.2	2						1400 - Take Sample MW-8 (0.5-2.5) VOC/SVOC/Metals/ Pesticides/PCBs
			0.1	3						
			0.2	4						
			0.0	5						
		0-6" - m-c brown sand with some gravel and brick; dry [FILL]	0.0	6	S-2	MACROCORE	24			
	+113.7	6-24" - greyish brown f-m sand with trace silt; moist (saturated at 22")	0.0	7						
			0.0	8						1420 - Take Sample MW-8 (7.5-9.5) VOC/SVOC/Metals/PCBs
		▽	0.0	9						
	+109.7	0-6" - dk brown silty sand; wet	0.0	10	S-3	MACROCORE	34			
		6-14" - dk brown sandy silt; wet	0.0	11						
		14-24" - brown m-f sand with some silt; wet	0.0	12						
			0.0	13						
	+106.2	24-34" - reddish brown m-c sand; wet	0.0	14						
			0.0	15						End of Boring at 15 ft bgs
	+104.7			16						
				17						
				18						
				19						
				20						

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LANGAN

Log of Boring **MW-9** Sheet 1 of 1

Project: Kingsbridge Armory	Project No.: 170246501
Location: 29 West Kingsbridge Rd. The Bronx, NY	Elevation and Datum: 117.8 feet above msl
Drilling Company: Laurel Environmental Associates, Ltd.	Date Started: 5/20/13 — Date Finished: 5/20/13
Drilling Equipment: Geoprobe 7822DT	Completion Depth: 15 ft — Rock Depth: N/A
Size and Type of Bit: 2" Macrocore	Number of Samples: Disturbed 2 — Undisturbed — Core
Casing Diameter (in): 2" — Casing Depth (ft): 5'	Water Level (ft.): First ▽ 9 — Completion ▼ — 24 HR. ▼
Casing Hammer: Steel — Weight (lbs) — Drop (in)	Drilling Foreman: Steve Bitetto
Sampler: Acetate Liner	Inspecting Engineer: Paul McMahon
Sampler Hammer — Weight (lbs) — Drop (in)	

Material Symbol	Elev. (ft)	Sample Description	PID Reading (ppm)	Depth Scale	Sample Data: Number	Type	Recov. (in)	Penetr. resist BL/6in	N-Value (Blows/ft) 10 20 30 40	Remarks (Drilling Fluid, Depth of Casing, Fluid Loss, Drilling Resistance, etc.)
	+117.8			0						
	+117.5	4" Concrete Slab								
		0-22" - brown f-m sand with some gravel; trace rock fragments; dry [FILL]	0.0	1						1445 - Start Drilling
			0.0	2	S-1	MACROCORE	22			1535 - Take Sample MW-9 (0-2) VOC/SVOC/Metals/ Pesticides/PCBs
			0.0	3						
			0.0	4						
		0-17" - brown silty m-f sand with some gravel, weathered rock, pulverized concrete; dry [FILL]	0.0	5						
			0.0	6						1545 - Take Sample MW-9 (6-8) VOC/SVOC/Metals/PCBs
			0.0	7	S-2	MACROCORE	27			
	+109.8	17-27" - brown silt with some m-f sand; wet ▽	0.0	8						
			0.0	9						
		0-4" - brown silt with some m-f sand; wet	0.0	10						
	+106.8	4-10" - dk gray silt; soft; organic odor	0.0	11						
	+105.8	10-26" - lt brown and gray coarse sand with trace rock fragments; wet	0.0	12	S-3	MACROCORE	26			
			0.0	13						
			0.0	14						
	+102.8		0.0	15						End of Boring at 15 ft bgs
				16						
				17						
				18						
				19						
				20						

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APPENDIX B

WELL CONSTRUCTION SUMMARY

Well No. **MW-6**

PROJECT Kingsbridge National Ice Center	**PROJECT NO.** 170246501
LOCATION New York, NY	**ELEVATION AND DATUM** 121.1 ft above msl Top of Casing
DRILLING AGENCY Laurel Environmental Associates, Ltd.	**DATE STARTED** 5/21/2013 **DATE FINISHED** 5/21/2013
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Steve Bitetto
SIZE AND TYPE OF BIT 2" Steel	**INSPECTOR** Paul McMahon

METHOD OF INSTALLATION

2" steel casing was used to advance the boring to 15 feet. A 10-foot long 1-inch diameter Schedule 40 PVC screen was set from a depth of approximately 3.6 to 13.6 feet. The annulus was filled with #1 morie filter sand to a depth of approximately 1 foot.

METHOD OF WELL DEVELOPMENT

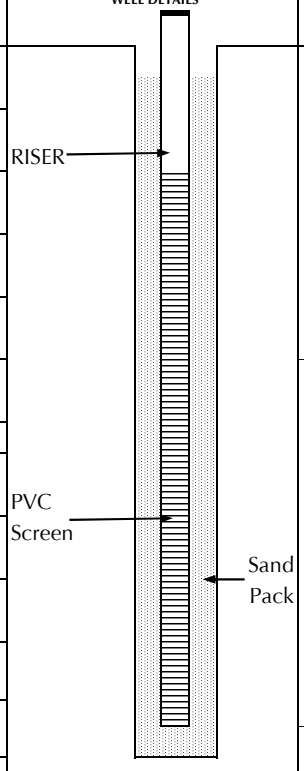
The well was purged with a peristaltic pump until the total purge volume was greater than 3 well volumes and NTU<50.

TYPE OF CASING PVC	**DIAMETER** 1-inch	**TYPE OF BACKFILL MATERIAL** N/A	
TYPE OF SCREEN PVC	**DIAMETER** 1-inch	**TYPE OF SEAL MATERIAL** N/A	
BOREHOLE DIAMETER 2.5"		**TYPE OF FILTER MATERIAL** # 1 Sand	

TOP OF CASING	**ELEVATION** 121.10	**DEPTH (ft)** -1.30
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)** N/A
TOP OF FILTER	**ELEVATION** 118.80	**DEPTH (ft)** 1.00
TOP OF SCREEN	**ELEVATION** 116.20	**DEPTH (ft)** 3.60
BOTTOM OF WELL	**ELEVATION** 106.20	**DEPTH (ft)** 13.60
SCREEN LENGTH	10 ft	
SLOT SIZE	0.02 in	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
109.40	5/22/13	10.40



SUMMARY SOIL CLASSIFICATION	DEPTH (FT) bgs
	1.0
Fill	3.6
Sand with trace Silt	8.0
	13.6

LANGAN Engineering and Environmental Services, Inc.

WELL CONSTRUCTION SUMMARY
Well No. MW-7

PROJECT	PROJECT NO.
Kingsbridge National Ice Center	170246501
LOCATION	ELEVATION AND DATUM
New York, NY	121.0 ft above msl Top of Casing
DRILLING AGENCY	DATE STARTED / DATE FINISHED
Laurel Environmental Associates, Ltd.	5/21/2013 / 5/21/2013
DRILLING EQUIPMENT	DRILLER
Geoprobe 6610DT	Steve Bitetto
SIZE AND TYPE OF BIT	INSPECTOR
2" Steel	Paul McMahon

METHOD OF INSTALLATION

2" steel casing was used to advance the boring to 15 feet. A 10-foot long 1-inch diameter Schedule 40 PVC screen was set from a depth of approximately 3.7 to 13.7 feet. The annulus was filled with #1 morie filter sand to a depth of approximately 1 foot.

METHOD OF WELL DEVELOPMENT

The well was purged with a peristaltic pump until the total purge volume was greater than 3 well volumes and NTU<50.

TYPE OF CASING	DIAMETER	TYPE OF BACKFILL MATERIAL
PVC	1-inch	N/A
TYPE OF SCREEN	DIAMETER	TYPE OF SEAL MATERIAL
PVC	1-inch	N/A
BOREHOLE DIAMETER		TYPE OF FILTER MATERIAL
2.5"		# 1 Sand

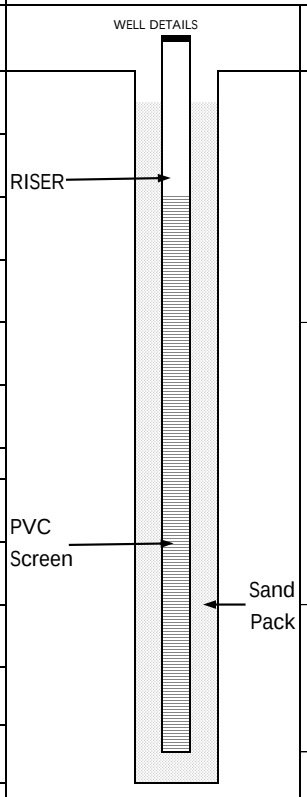
	ELEVATION	DEPTH (ft)
TOP OF CASING	121.00	-1.20
TOP OF SEAL		N/A
TOP OF FILTER	118.80	1.00
TOP OF SCREEN	116.10	3.70
BOTTOM OF WELL	106.10	13.70

SCREEN LENGTH: 10 ft

SLOT SIZE: 0.02 in

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
110.40	5/22/13	9.40



SUMMARY SOIL CLASSIFICATION	DEPTH (FT) bgs
	1.0
Fill	3.7
	6.0
Sand	
	12.0
Sandy Silt	
	13.7

LANGAN Engineering and Environmental Services, Inc.

WELL CONSTRUCTION SUMMARY

Well No. **MW-8**

PROJECT Kingsbridge National Ice Center	**PROJECT NO.** 170246501
LOCATION New York, NY	**ELEVATION AND DATUM** 120.7 ft above msl Top of Casing
DRILLING AGENCY Laurel Environmental Associates, Ltd.	**DATE STARTED** 5/21/2013 **DATE FINISHED** 5/21/2013
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Steve Bitetto
SIZE AND TYPE OF BIT 2" Steel	**INSPECTOR** Paul McMahon

METHOD OF INSTALLATION

2" steel casing was used to advance the boring to 15 feet. A 10-foot long 1-inch diameter Schedule 40 PVC screen was set from a depth of approximately 3.8 to 13.8 feet. The annulus was filled with #1 morie filter sand to a depth of approximately 1 foot.

METHOD OF WELL DEVELOPMENT

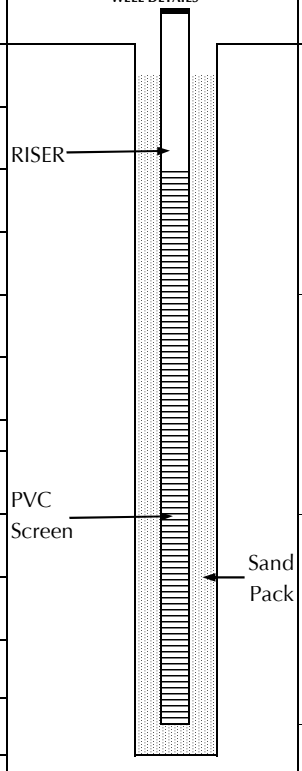
The well was purged with a peristaltic pump until the total purge volume was greater than 3 well volumes and NTU<50.

TYPE OF CASING PVC	**DIAMETER** 1-inch	**TYPE OF BACKFILL MATERIAL** N/A	
TYPE OF SCREEN PVC	**DIAMETER** 1-inch	**TYPE OF SEAL MATERIAL** N/A	
BOREHOLE DIAMETER 2.5"		**TYPE OF FILTER MATERIAL** # 1 Sand	

TOP OF CASING	**ELEVATION** 120.70	**DEPTH (ft)** -1.00
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)** N/A
TOP OF FILTER	**ELEVATION** 118.70	**DEPTH (ft)** 1.00
TOP OF SCREEN	**ELEVATION** 115.90	**DEPTH (ft)** 3.80
BOTTOM OF WELL	**ELEVATION** 105.90	**DEPTH (ft)** 13.80
SCREEN LENGTH	10 ft	
SLOT SIZE	0.02 in	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
109.30	5/22/13	10.40



SUMMARY SOIL CLASSIFICATION	DEPTH (FT) bgs
	1.0
Fill	3.8
Sand	6.0
Sand and Silt	10.0
	13.8

LANGAN Engineering and Environmental Services, Inc.

WELL CONSTRUCTION SUMMARY

Well No. **MW-9**

PROJECT Kingsbridge National Ice Center	**PROJECT NO.** 170246501
LOCATION New York, NY	**ELEVATION AND DATUM** 118.9 ft above msl Top of Casing
DRILLING AGENCY Laurel Environmental Associates, Ltd.	**DATE STARTED** 5/21/2013 **DATE FINISHED** 5/21/2013
DRILLING EQUIPMENT Geoprobe 6610DT	**DRILLER** Steve Bitetto
SIZE AND TYPE OF BIT 2" Steel	**INSPECTOR** Paul McMahon

METHOD OF INSTALLATION

2" steel casing was used to advance the boring to 15 feet. A 10-foot long 1-inch diameter Schedule 40 PVC screen was set from a depth of approximately 3.7 to 13.7 feet. The annulus was filled with #1 morie filter sand to a depth of approximately 1 foot.

METHOD OF WELL DEVELOPMENT

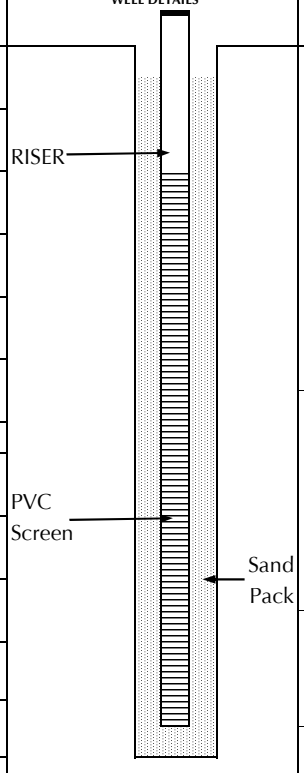
The well was purged with a peristaltic pump until the total purge volume was greater than 3 well volumes and NTU<50.

TYPE OF CASING PVC	**DIAMETER** 1-inch	**TYPE OF BACKFILL MATERIAL** N/A	
TYPE OF SCREEN PVC	**DIAMETER** 1-inch	**TYPE OF SEAL MATERIAL** N/A	
BOREHOLE DIAMETER 2.5"		**TYPE OF FILTER MATERIAL** # 1 Sand	

TOP OF CASING	**ELEVATION** 118.90	**DEPTH (ft)** -1.10
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)** N/A
TOP OF FILTER	**ELEVATION** 116.80	**DEPTH (ft)** 1.00
TOP OF SCREEN	**ELEVATION** 114.40	**DEPTH (ft)** 3.40
BOTTOM OF WELL	**ELEVATION** 104.40	**DEPTH (ft)** 13.40
SCREEN LENGTH	10 ft	
SLOT SIZE	0.02 in	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
108.70	5/22/13	9.10



SUMMARY SOIL CLASSIFICATION	DEPTH (FT) bgs
	1.0
Fill	3.4
Silt	8.0
Coarse Sand	12.0
	13.4

LANGAN Engineering and Environmental Services, Inc.

WELL CONSTRUCTION SUMMARY

Well No. **MW-10**

PROJECT Kingsbridge National Ice Center	**PROJECT NO.** 170246501
LOCATION New York, NY	**ELEVATION AND DATUM** 140.1 ft above msl Top of Casing
DRILLING AGENCY Laurel Environmental Associates, Ltd.	**DATE STARTED** 5/21/2013 **DATE FINISHED** 5/21/2013
DRILLING EQUIPMENT Geoprobe 7822DT	**DRILLER** Kevin Kegel
SIZE AND TYPE OF BIT 2" Steel	**INSPECTOR** Paul McMahon

METHOD OF INSTALLATION

2" steel casing was used to advance the boring to 35 feet. A 10-foot long 1-inch diameter Schedule 40 PVC screen was set from a depth of approximately 24.2 to 34.2 feet. The annulus was filled with #1 morie filter sand to a depth of approximately 21 feet.

METHOD OF WELL DEVELOPMENT

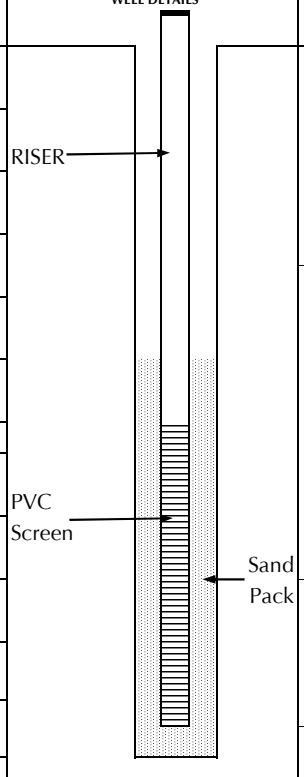
The well was purged using a combination of weighted bailor and peristaltic pump. 4 Liters were purged using a weighted bailor. The well was subsequently purged with a peristaltic pump until NTU<50.

TYPE OF CASING PVC	**DIAMETER** 1-inch	**TYPE OF BACKFILL MATERIAL** N/A	
TYPE OF SCREEN PVC	**DIAMETER** 1-inch	**TYPE OF SEAL MATERIAL** N/A	
BOREHOLE DIAMETER 2.5"		**TYPE OF FILTER MATERIAL** # 1 Sand	

TOP OF CASING	**ELEVATION** 140.10	**DEPTH (ft)** -1.00
TOP OF SEAL	**ELEVATION**	**DEPTH (ft)** N/A
TOP OF FILTER	**ELEVATION** 118.10	**DEPTH (ft)** 21.00
TOP OF SCREEN	**ELEVATION** 114.90	**DEPTH (ft)** 24.20
BOTTOM OF WELL	**ELEVATION** 104.90	**DEPTH (ft)** 34.20
SCREEN LENGTH	10 ft	
SLOT SIZE	0.02 in	

GROUNDWATER ELEVATIONS

ELEVATION	DATE	DEPTH TO WATER
110.60	5/22/13	28.50



SUMMARY SOIL CLASSIFICATION	DEPTH (FT) bgs
Fill	
	18.0
Fine Sand, Some Silt	21.0
	24.2
	30.0
Coarse Sand	
	34.2

LANGAN Engineering and Environmental Services, Inc.

APPENDIX C

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site: 29 West Kingsbridge Road	**Well#/Location:** MW-3	**Job No.:** 170246501
Date: 05/23/2013	**Weather:** 60's, Rain, Cloudy	**Sampling Personnel:** A. Rosenblatt

Well Information

Sample ID	MW-3 (052313)
Well Depth (ft)	12
Screened Interval (ft)	2-12
Casing Elevation (ft msl)	115.2
Casing Diameter (in)	1
Depth to Water (ft)	3.0
Water Elevation (ft msl)	112.2
Casing Volume (gal)	1.47
PID Reading (ppm)	0.0

Purging Information

Purging Method	Peristaltic Pump
Purging Rate (mL/min)	210
Start Purge Time	11:15
End Purge Time	12:20
Approx. Vol. Purged (gal)	2.1

Sampling Information

Sampling Method	Peristaltic Pump
Start Sampling Time	12:20
End Sampling Time	12:50
Depth Before Sampling (ft)	N/A
Number Bottles Collected	7

	Parameters							
Sample Time	**pH**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Temp (◦C)**	**ORP (mV)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
11:15	6.99	0.004	174	12.10	15.07	113		0.4
11:20	7.01	0.006	171	10.34	14.97	125		
11:25	7.05	0.006	172	9.97	14.91	124		
11:30	7.09	0.006	174	9.77	14.87	131		0.8
11:32	Pump Off - allow recharge							
11:45	Pump On							
11:45	7.09	0.003	174	9.65	14.83	119		
11:50	7.27	0.007	176	9.94	14.72	74		1.2
11:51	Pump Off - allow recharge							
12:00	Pump On							
12:00	7.33	0.007	178	10.08	14.67	85		
12:05	7.33	0.007	177	9.84	14.67	54		1.6
12:10	7.37	0.007	177	10.15		57		
12:11	Pump Off - allow recharge							
12:15	7.37	0.011	178	10.25	14.53	61		2.1
12:20	Take Sample							

Notes/Remarks

Effluent water was observed to be clear and parameters were stablized, therefore the sample was taken despite turbidity >50 NTU.

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site: 29 West Kingsbridge Road	**Well#/Location:** MW-6	**Job No.:** 170246501
Date: 05/23/2013	**Weather:** 60's, Rain, Cloudy	**Sampling Personnel:** P. McMahon

Well Information

Sample ID	MW-6 (052313)
Well Depth (ft)	14.9
Screened Interval (ft)	4.9-14.9
Casing Elevation (ft msl)	121.1
Casing Diameter (in)	1
Depth to Water (ft)	11.7
Water Elevation (ft msl)	109.4
Casing Volume (gal)	0.52
PID Reading (ppm)	0.0

Purging Information

Purging Method	Peristaltic Pump
Purging Rate (mL/min)	200
Start Purge Time	7:45
End Purge Time	9:45
Approx. Vol. Purged (gal)	1.32

Sampling Information

Sampling Method	Peristaltic Pump
Start Sampling Time	9:50
End Sampling Time	10:50
Depth Before Sampling (ft)	N/A
Number Bottles Collected	7

	Parameters							
Sample Time	**pH**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Temp (◦C)**	**ORP (mV)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
7:45	Pump On - Begin Purging							
8:00	Pump Off							0.53
8:07	Pump On							
8:16	7.72	0.431	135	6.44	14.21	79		
8:21	7.43	0.415	98	7.21	14.16	77		1.06
8:26	Pump On							
9:33	7.36	0.004	171	10.67	13.16	36		
9:35	Pump Off - allow recharge							1.2
9:43	Pump On							
9:45	7.37	0.022	170	9.34	13.47	31		1.32

Notes/Remarks

Effluent water was observed to be clear and parameters were stablized, therefore the sample was taken despite turbidity >50 NTU.

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site: 29 West Kingsbridge Road	**Well#/Location:** MW-7	**Job No.:** 170246501
Date: 05/23/2013	**Weather:** 60's, Rain, Cloudy	**Sampling Personnel:** A. Rosenblatt

Well Information

Sample ID	MW-7 (052313)
Well Depth (ft)	13.7
Screened Interval (ft)	3.7-13.7
Casing Elevation (ft msl)	121.0
Casing Diameter (in)	1
Depth to Water (ft)	9.4
Water Elevation (ft msl)	111.6
Casing Volume (gal)	0.70
PID Reading (ppm)	0.0

Purging Information

Purging Method	Peristaltic Pump
Purging Rate (mL/min)	305
Start Purge Time	13:07
End Purge Time	13:30
Approx. Vol. Purged (gal)	2.2

Sampling Information

Sampling Method	Peristaltic Pump
Start Sampling Time	13:30
End Sampling Time	13:50
Depth Before Sampling (ft)	N/A
Number Bottles Collected	14

	Parameters							
Sample Time	**pH**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Temp (◦C)**	**ORP (mV)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
13:03	Begin Purging							
13:07	7.72	0.015	183	11.55	14.55	-6		0.26
13:13	7.62	0.014	174	10.24	14.5	-15		
13:18	7.56	0.014	174	9.93	14.44	-4		1.2
13:25	7.52	0.007	178	9.64	14	-11.00		
13:30	Take Samples							2.2

Notes/Remarks

Effluent water was observed to be clear and parameters were stablized, therefore the sample was taken despite turbidity >50 NTU.

DUP-1 (052313) taken

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site: 29 West Kingsbridge Road	**Well#/Location:** MW-8	**Job No.:** 170246501
Date: 05/23/2013	**Weather:** 60's, Rain, Cloudy	**Sampling Personnel:** A. Rosenblatt

Well Information

Sample ID	MW-8 (052313)
Well Depth (ft)	13.8
Screened Interval (ft)	3.8-13.8
Casing Elevation (ft msl)	120.7
Casing Diameter (in)	1
Depth to Water (ft)	10.4
Water Elevation (ft msl)	110.3
Casing Volume (gal)	0.55
PID Reading (ppm)	0.0

Purging Information

Purging Method	Peristaltic Pump
Purging Rate (mL/min)	250
Start Purge Time	14:00
End Purge Time	14:32
Approx. Vol. Purged (gal)	1.7

Sampling Information

Sampling Method	Peristaltic Pump
Start Sampling Time	14:32
End Sampling Time	14:45
Depth Before Sampling (ft)	N/A
Number Bottles Collected	7

	Parameters							
Sample Time	**pH**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Temp (◦C)**	**ORP (mV)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
14:00	Begin Purging							
14:11	7.39	0.011	182	9.92	14.74	24		0.3
14:16	7.39	0.011	177	9.25	14.68	12		0.8
14:21	7.38	0.011	177	9.04	14.65	16		1.05
14:26	7.38	0.010	176	8.88	15	20.00		1.3
14:32	Take Samples							1.7

Notes/Remarks

Effluent water was observed to be clear and parameters were stablized, therefore the sample was taken despite turbidity >50 NTU.

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site: 29 West Kingsbridge Road	**Well#/Location:** MW-9	**Job No.:** 170246501
Date: 05/23/2013	**Weather:** 60's, Rain, Cloudy	**Sampling Personnel:** P. McMahon

Well Information

Sample ID	MW-9 (052313)
Well Depth (ft)	13.4
Screened Interval (ft)	3.4-13.4
Casing Elevation (ft msl)	118.9
Casing Diameter (in)	1
Depth to Water (ft)	9.1
Water Elevation (ft msl)	109.8
Casing Volume (gal)	0.70
PID Reading (ppm)	0.0

Purging Information

Purging Method	Peristaltic Pump
Purging Rate (mL/min)	270
Start Purge Time	8:29
End Purge Time	8:55
Approx. Vol. Purged (gal)	1.85

Sampling Information

Sampling Method	Peristaltic Pump
Start Sampling Time	8:55
End Sampling Time	9:05
Depth Before Sampling (ft)	N/A
Number Bottles Collected	7

	Parameters							
Sample Time	**pH**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Temp (◦C)**	**ORP (mV)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
8:29	Begin Purging							
8:37	7.57	1.13	270	4.02	12.79	-13		
8:42	7.65	1.11	41.0	3.06	12.10	-51		0.7
8:47	7.63	1.11	10.4	2.27	12.04	-43		1.2
8:52	7.62	1.11	9.5	2.13	12.00	-33		1.6
8:55	Take Sample							1.85
9:03	7.58	1.11	0.5	1.99	11.9	-17		2.4

Notes/Remarks

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site: 29 West Kingsbridge Road	**Well#/Location:** MW-10	**Job No.:** 170246501
Date: 05/23/2013	**Weather:** 60's, Rain, Cloudy	**Sampling Personnel:** P. McMahon

Well Information

Sample ID	MW-10 (052313)
Well Depth (ft)	34.2
Screened Interval (ft)	24.2-34.2
Casing Elevation (ft msl)	140.1
Casing Diameter (in)	1
Depth to Water (ft)	29.5
Water Elevation (ft msl)	110.6
Casing Volume (gal)	0.77
PID Reading (ppm)	0.0

Purging Information

Purging Method	Weighted Bailer/ Peristaltic Pump
Purging Rate (mL/min)	250
Start Purge Time	15:55
End Purge Time	16:25
Approx. Vol. Purged (gal)	3.4

Sampling Information

Sampling Method	Peristaltic Pump
Start Sampling Time	16:25
End Sampling Time	16:40
Depth Before Sampling (ft)	N/A
Number Bottles Collected	7

	Parameters							
Sample Time	**pH**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Temp (◦C)**	**ORP (mV)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
15;55	Begin Purging						29.50	1.37
15:59	6.76	2.61	83.5	3.15	17.17	65		1.63
16:01	6.81	2.62	27.1	2.45	16.87	49		
16:25	6.86	2.63	0.0	1.83	16.65	29		3.36
16:25	Take Sample							

Notes/Remarks

Approximately 5.4 Liters purged with weighted bailer before switching to peristaltic pump.

Heavy rain during sampling

GROUND WATER SAMPLE FIELD INFORMATION FORM

Site: 29 West Kingsbridge Road	**Well#/Location:** TRC-MW-3	**Job No.:** 170246501
Date: 05/24/2013	**Weather:** 60's, Cloudy	**Sampling Personnel:** P. McMahon

Well Information

Sample ID	TRC-MW-3 (052413)
Well Depth (ft)	38.1
Screened Interval (ft)	N/A
Casing Elevation (ft msl)	139.26
Casing Diameter (in)	2
Depth to Water (ft)	27.2
Water Elevation (ft msl)	112.06
Casing Volume (gal)	1.78
PID Reading (ppm)	0.0

Purging Information

Purging Method	Peristaltic Pump
Purging Rate (mL/min)	315
Start Purge Time	8:16
End Purge Time	14:26
Approx. Vol. Purged (gal)	10

Sampling Information

Sampling Method	Peristaltic Pump
Start Sampling Time	10:20
End Sampling Time	10:30
Depth Before Sampling (ft)	27.80
Number Bottles Collected	7

	Parameters							
Sample Time	**pH**	**Conductivity (mS/cm)**	**Turbidity (NTU)**	**Dissolved Oxygen (mg/L)**	**Temp (◦C)**	**ORP (mV)**	**Depth to Water (ft)**	**Purged Volume (gallons)**
8:16	Pump On							
9:16	Continue Purging							5
10:05								9
10:08	6.98	2.51	0.0	3.56	16.99	115	27.60	
10:13	6.97	2.55	0.0	2.84	16.75	112	27.80	
10:18	6.98	2.53	0.0	2.73	16.58	107	27.80	10
10:20	Start Sample							
10:30	End Sample							

Notes/Remarks

APPENDIX D

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-1

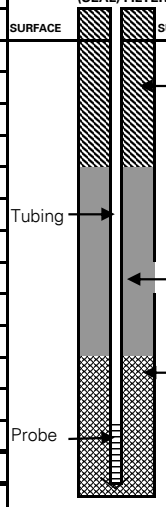
PROJECT: Kingsbridge National Ice Center	**PROJECT NO.:** 170246501
LOCATION: The Bronx, NY	**SURFACE ELEVATION AND DATUM:** 119.8 ft above mean sea level
DRILLING FIRM OR LANGAN INSTALLER: Laurel Environmental Associates, Ltd.	**INSTALLATION DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION FOREMAN: Steve Bitetto	**SAMPLE DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION EQUIPMENT: Hilti Hammer Drill with 3/4" x 24" bit	**TYPE OF SAMPLING DEVICE:** 6-L Summa Canister with 2-hour Flow Regulator
INSPECTOR: Paul McMahon	**SAMPLER:** Paul McMahon
POTENTIAL SAMPLE INTERFERENCES: None	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** @ INSTALLATION: Mostly Cloudy, 60's, Wind: SW @ SAMPLING: Mostly Cloudy, 60's, Wind: SW

METHOD OF INSTALLATION AND PURGING:
Install soil vapor point with a Hilti hammer drill.
Purge with a PID for 5 min at at flow rate of 500 ml/min.
Sample Type = Integrated 2-hour sample; soil vapor sample.

TUBING TYPE/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 3/4"	**FILTER PACK MATERIAL (Sand or Glass Beads):** #2 Morie Sand

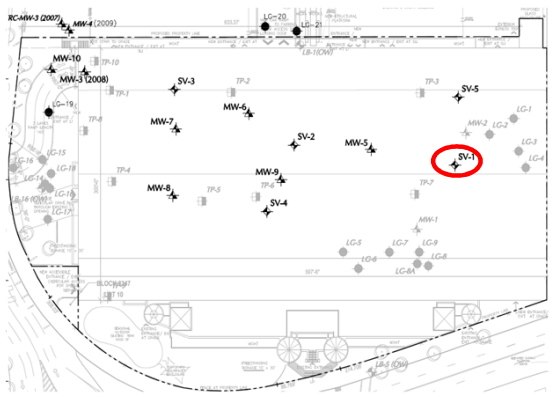
PURGE VOLUME (L):	2.50
PURGE FLOW RATE (ML/MIN):	500
PID AFTER PURGE (PPM):	3.1
HELIUM TEST IN BUCKET(%):	35.1%
HELIUM TEST IN TUBE (PPM):	300
SAMPLE START DATE/TIME:	5/20/2013 11:08
SAMPLE STOP DATE/TIME:	5/20/2013 13:07
TOTAL SAMPLE TIME (MIN):	119
FLOW RATE (L/MIN):	N/A
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	7.5
SAMPLE MOISTURE CONTENT:	N/A
CAN SERIAL NUMBER:	01025
REGULATOR SERIAL NUMBER:	05236
CAN START VACUUM PRESS. (" HG):	-32
CAN STOP VACUUM PRESS. (" HG):	-8

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)



DEPTH (FROM SURFACE)	NOTES
TOP OF SLAB	
4"	
12"	

SAMPLE LOCATION SKETCH



NOTES

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, New York 10001-2727

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-2

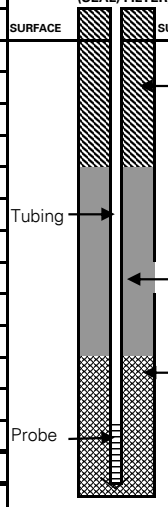
PROJECT: Kingsbridge National Ice Center	**PROJECT NO.:** 170246501
LOCATION: The Bronx, NY	**SURFACE ELEVATION AND DATUM:** 119.8 ft above mean sea level
DRILLING FIRM OR LANGAN INSTALLER: Laurel Environmental Associates, Ltd.	**INSTALLATION DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION FOREMAN: Steve Bitetto	**SAMPLE DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION EQUIPMENT: Hilti Hammer Drill with 3/4" x 24" bit	**TYPE OF SAMPLING DEVICE:** 6-L Summa Canister with 2-hour Flow Regulator
INSPECTOR: Paul McMahon	**SAMPLER:** Paul McMahon
POTENTIAL SAMPLE INTERFERENCES: None	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** @ INSTALLATION: Mostly Cloudy, 60's, Wind: SW @ SAMPLING: Mostly Cloudy, 60's, Wind: SW

METHOD OF INSTALLATION AND PURGING:
Install soil vapor point with a
Purge with a PID for 5 min at at flow rate of 500 ml/min.
Sample Type = Integrated 2-hour sample; soil vapor sample.

TUBING TYPE/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 3/4"	**FILTER PACK MATERIAL (Sand or Glass Beads):** #2 Morie Sand

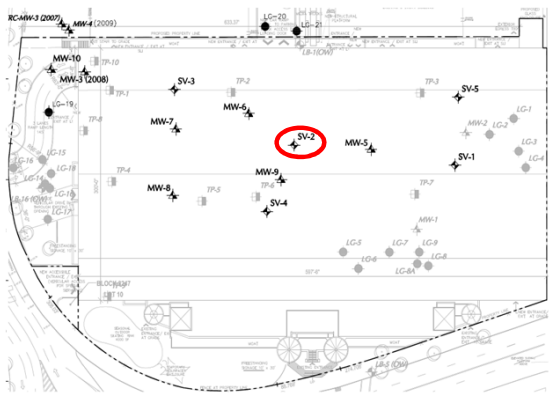
PURGE VOLUME (L):	2.50
PURGE FLOW RATE (ML/MIN):	500
PID AFTER PURGE (PPM):	1.4
HELIUM TEST IN BUCKET(%):	39.4%
HELIUM TEST IN TUBE (PPM):	175
SAMPLE START DATE/TIME:	5/20/2013 10:19
SAMPLE STOP DATE/TIME:	5/20/2013 12:23
TOTAL SAMPLE TIME (MIN):	124
FLOW RATE (L/MIN):	N/A
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	6.4
SAMPLE MOISTURE CONTENT:	N/A
CAN SERIAL NUMBER:	York S04
REGULATOR SERIAL NUMBER:	05232
CAN START VACUUM PRESS. (" HG):	-29
CAN STOP VACUUM PRESS. (" HG):	-5

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)



DEPTH (FROM SURFACE)	NOTES
TOP OF SLAB	
4"	
12"	

SAMPLE LOCATION SKETCH



NOTES

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, New York 10001-2727

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-3

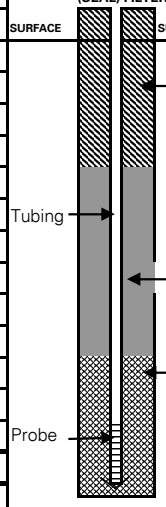
PROJECT: Kingsbridge National Ice Center	**PROJECT NO.:** 170246501
LOCATION: The Bronx, NY	**SURFACE ELEVATION AND DATUM:** 119.9 ft above mean sea level
DRILLING FIRM OR LANGAN INSTALLER: Laurel Environmental Associates, Ltd.	**INSTALLATION DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION FOREMAN: Steve Bitetto	**SAMPLE DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION EQUIPMENT: Hilti Hammer Drill with 3/4" x 24" bit	**TYPE OF SAMPLING DEVICE:** 6-L Summa Canister with 2-hour Flow Regulator
INSPECTOR: Paul McMahon	**SAMPLER:** Paul McMahon
POTENTIAL SAMPLE INTERFERENCES: None	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** @ INSTALLATION: Mostly Cloudy, 60's, Wind: SW @ SAMPLING: Mostly Cloudy, 60's, Wind: SW

METHOD OF INSTALLATION AND PURGING:
Install soil vapor point with a
Purge with a PID for 5 min at at flow rate of 500 ml/min.
Sample Type = Integrated 2-hour sample; soil vapor sample.

TUBING TYPE/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 3/4"	**FILTER PACK MATERIAL (Sand or Glass Beads):** #2 Morie Sand

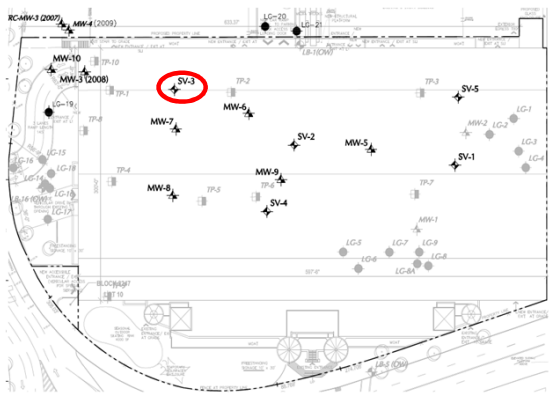
PURGE VOLUME (L):	2.50
PURGE FLOW RATE (ML/MIN):	500
PID AFTER PURGE (PPM):	1.2
HELIUM TEST IN BUCKET(%):	9.8%
HELIUM TEST IN TUBE (PPM):	1000
SAMPLE START DATE/TIME:	5/20/2013 13:04
SAMPLE STOP DATE/TIME:	5/20/2013 15:06
TOTAL SAMPLE TIME (MIN):	122
FLOW RATE (L/MIN):	N/A
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	
SAMPLE MOISTURE CONTENT:	N/A
CAN SERIAL NUMBER:	01047
REGULATOR SERIAL NUMBER:	02905
CAN START VACUUM PRESS. (" HG):	-29.5
CAN STOP VACUUM PRESS. (" HG):	-7

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)



DEPTH (FROM SURFACE)	NOTES
TOP OF SLAB	
6"	
12"	

SAMPLE LOCATION SKETCH



NOTES

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, New York 10001-2727

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-4

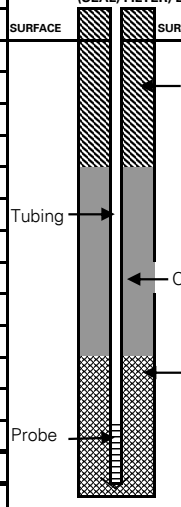
PROJECT: Kingsbridge National Ice Center	**PROJECT NO.:** 170246501
LOCATION: The Bronx, NY	**SURFACE ELEVATION AND DATUM:** 119.8 ft above mean sea level
DRILLING FIRM OR LANGAN INSTALLER: Laurel Environmental Associates, Ltd.	**INSTALLATION DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION FOREMAN: Steve Bitetto	**SAMPLE DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION EQUIPMENT: Hilti Hammer Drill with 3/4" x 24" bit	**TYPE OF SAMPLING DEVICE:** 6-L Summa Canister with 2-hour Flow Regulator
INSPECTOR: Paul McMahon	**SAMPLER:** Paul McMahon
POTENTIAL SAMPLE INTERFERENCES: None	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** @ INSTALLATION: Mostly Cloudy, 60's, Wind: SW @ SAMPLING: Mostly Cloudy, 60's, Wind: SW

METHOD OF INSTALLATION AND PURGING:
Install soil vapor point with a
Purge with a PID for 5 min at at flow rate of 500 ml/min.
Sample Type = Integrated 2-hour sample; soil vapor sample.

TUBING TYPE/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 3/4"	**FILTER PACK MATERIAL (Sand or Glass Beads):** #2 Morie Sand

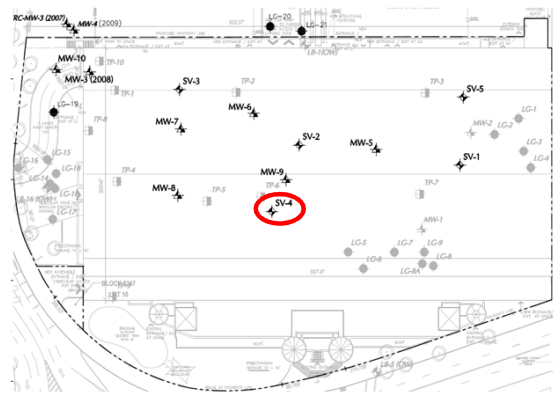
PURGE VOLUME (L):	2.50
PURGE FLOW RATE (ML/MIN):	500
PID AFTER PURGE (PPM):	1.6
HELIUM TEST IN BUCKET(%):	35.1%
HELIUM TEST IN TUBE (PPM):	0
SAMPLE START DATE/TIME:	5/20/2013 9:57
SAMPLE STOP DATE/TIME:	5/20/2013 12:06
TOTAL SAMPLE TIME (MIN):	129
FLOW RATE (L/MIN):	N/A
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	4.8
SAMPLE MOISTURE CONTENT:	N/A
CAN SERIAL NUMBER:	P-01
REGULATOR SERIAL NUMBER:	02244
CAN START VACUUM PRESS. (" HG):	-32
CAN STOP VACUUM PRESS. (" HG):	-5

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)



DEPTH (FROM SURFACE)	NOTES
TOP OF SLAB	
6"	
12"	

SAMPLE LOCATION SKETCH



NOTES

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, New York 10001-2727

SOIL VAPOR SAMPLING LOG SHEET

Sample Number: SV-5

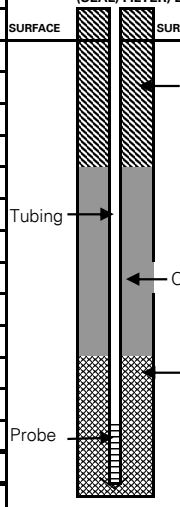
PROJECT: Kingsbridge National Ice Center	**PROJECT NO.:** 170246501
LOCATION: The Bronx, NY	**SURFACE ELEVATION AND DATUM:** 119.8 ft above mean sea level
DRILLING FIRM OR LANGAN INSTALLER: Laurel Environmental Associates, Ltd.	**INSTALLATION DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION FOREMAN: Steve Bitetto	**SAMPLE DATE STARTED:** 5/20/2013 **DATE FINISHED:** 5/20/2013
INSTALLATION EQUIPMENT: Hilti Hammer Drill with 3/4" x 24" bit	**TYPE OF SAMPLING DEVICE:** 6-L Summa Canister with 2-hour Flow Regulator
INSPECTOR: Paul McMahon	**SAMPLER:** Paul McMahon
POTENTIAL SAMPLE INTERFERENCES: None	**WEATHER CONDITIONS (PRECIP., TEMP., PRESS., WIND SPEED AND DIR.):** @ INSTALLATION: Mostly Cloudy, 60's, Wind: SW @ SAMPLING: Mostly Cloudy, 60's, Wind: SW

METHOD OF INSTALLATION AND PURGING:
Install soil vapor point with a
Purge with a PID for 5 min at at flow rate of 500 ml/min.
Sample Type = Integrated 2-hour sample; soil vapor sample.

TUBING TYPE/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**TYPE OF MATERIAL ABOVE SEAL:** Bentonite
IMPLANT SCREEN TYPE/LENGTH/DIAMETER: Poly (1/2" OD; 3/8 " ID)	**SEAL MATERIAL (Bentonite, Beeswax, Modeling Clay, etc.):** Bentonite
BOREHOLE DIAMETER: 3/4"	**FILTER PACK MATERIAL (Sand or Glass Beads):** #2 Morie Sand

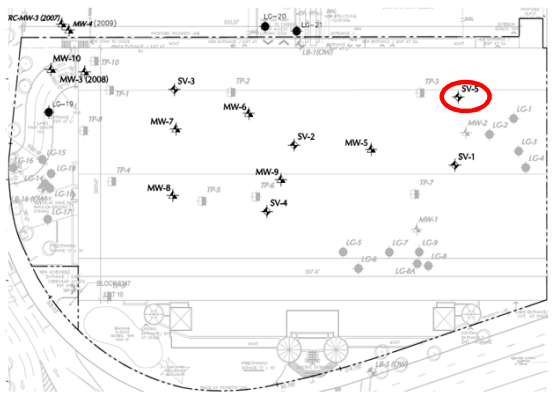
PURGE VOLUME (L):	2.50
PURGE FLOW RATE (ML/MIN):	500
PID AFTER PURGE (PPM):	2.1
HELIUM TEST IN BUCKET(%):	26.4%
HELIUM TEST IN TUBE (PPM):	0
SAMPLE START DATE/TIME:	5/20/2013 10:47
SAMPLE STOP DATE/TIME:	5/20/2013 12:44
TOTAL SAMPLE TIME (MIN):	117
FLOW RATE (L/MIN):	N/A
VOLUME OF SAMPLE (LITERS):	6
PID AFTER SAMPLE (PPM):	6.4
SAMPLE MOISTURE CONTENT:	N/A
CAN SERIAL NUMBER:	York S-18
REGULATOR SERIAL NUMBER:	04768
CAN START VACUUM PRESS. (" HG):	-28
CAN STOP VACUUM PRESS. (" HG):	-6

IMPLANT/PROBE DETAILS (SEAL, FILTER, ETC.)



DEPTH (FROM SURFACE)	NOTES
TOP OF SLAB	
6"	
12"	

SAMPLE LOCATION SKETCH



NOTES

Langan Engineering, Environmental, Surveying and Landscape Architecture, D.P.C.
21 Penn Plaza, 360 West 31st Street, 8th Floor, New York, New York 10001-2727

APPENDIX E

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Report Date: 05/28/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0710

Report Date: 05/28/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0710

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on May 21, 2013 and listed below. The project was identified as your project: **170246501**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the attachment to this report, and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
13E0710-01	SV-1 (SN 01025)	Soil Vapor	05/20/2013	05/21/2013
13E0710-02	SV-2 (S 04)	Soil Vapor	05/20/2013	05/21/2013
13E0710-03	SV-3 (01047)	Soil Vapor	05/20/2013	05/21/2013
13E0710-04	SV-4 (P-01)	Soil Vapor	05/20/2013	05/21/2013
13E0710-05	SV-5 (S 18)	Soil Vapor	05/20/2013	05/21/2013
13E0710-06	KIC_AA (10091)	Indoor Ambient Air	05/20/2013	05/21/2013

General Notes for York Project (SDG) No.: 13E0710

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation, unless otherwise noted.
6. All analyses conducted met method or Laboratory SOP requirements. See the Qualifiers and/or Narrative sections for further information.
7. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
8. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.

Approved By: 

Date: 05/28/2013

Benjamin Gulizia
Laboratory Director

YORK

Sample Information

Client Sample ID: SV-1 (SN 01025) **York Sample ID:** 13E0710-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND	U	ug/m³	4.9	4.9	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
108-05-4	Vinyl acetate	ND	U	ug/m³	6.7	6.7	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
79-01-6	Trichloroethylene	ND	U	ug/m³	5.1	5.1	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/m³	8.7	8.7	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/m³	7.6	7.6	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
108-88-3	Toluene	**15**	D	ug/m³	7.2	7.2	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
109-99-9	Tetrahydrofuran	ND	U	ug/m³	5.6	5.6	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
127-18-4	Tetrachloroethylene	ND	U	ug/m³	13	13	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
100-42-5	Styrene	ND	U	ug/m³	8.1	8.1	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
115-07-01	Propylene	ND	U	ug/m³	3.3	3.3	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
622-96-8	p-Ethyltoluene	ND	U	ug/m³	47	47	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
179601-23-1	p- & m- Xylenes	ND	U	ug/m³	17	17	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
95-47-6	o-Xylene	ND	U	ug/m³	8.3	8.3	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
110-54-3	n-Hexane	**120**	D	ug/m³	6.7	6.7	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
142-82-5	n-Heptane	**47**	D	ug/m³	7.8	7.8	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-09-2	Methylene chloride	**13**	D	ug/m³	6.6	6.6	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/m³	6.9	6.9	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
108-10-1	4-Methyl-2-pentanone	ND	U	ug/m³	7.8	7.8	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
67-63-0	Isopropanol	ND	U	ug/m³	4.7	4.7	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
87-68-3	Hexachlorobutadiene	ND	U	ug/m³	20	20	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
100-41-4	Ethyl Benzene	ND	U	ug/m³	8.3	8.3	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
141-78-6	Ethyl acetate	ND	U	ug/m³	6.9	6.9	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
110-82-7	Cyclohexane	ND	U	ug/m³	6.6	6.6	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/m³	8.7	8.7	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/m³	7.6	7.6	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
74-87-3	Chloromethane	ND	U	ug/m³	3.9	3.9	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
67-66-3	Chloroform	ND	U	ug/m³	9.3	9.3	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-00-3	Chloroethane	ND	U	ug/m³	5.0	5.0	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
56-23-5	Carbon tetrachloride	ND	U	ug/m³	6.0	6.0	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-15-0	Carbon disulfide	ND	U	ug/m³	5.9	5.9	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
74-83-9	Bromomethane	ND	U	ug/m³	7.4	7.4	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-25-2	Bromoform	ND	U	ug/m³	20	20	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD

Sample Information

Client Sample ID: SV-1 (SN 01025) **York Sample ID:** 13E0710-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-27-4	Bromodichloromethane	ND	U	ug/m³	12	12	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
100-44-7	Benzyl chloride	ND	U	ug/m³	9.9	9.9	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
71-43-2	Benzene	ND	U	ug/m³	6.1	6.1	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
67-64-1	Acetone	**58**	D	ug/m³	4.5	4.5	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
591-78-6	2-Hexanone	ND	U	ug/m³	7.8	7.8	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
78-93-3	2-Butanone	ND	U	ug/m³	5.6	5.6	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
123-91-1	1,4-Dioxane	ND	U	ug/m³	6.9	6.9	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
106-46-7	1,4-Dichlorobenzene	ND	U	ug/m³	11	11	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
541-73-1	1,3-Dichlorobenzene	ND	U	ug/m³	11	11	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
106-99-0	1,3-Butadiene	ND	U	ug/m³	8.3	8.3	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/m³	9.4	9.4	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
76-14-2	1,2-Dichlorotetrafluoroethane	ND	U	ug/m³	13	13	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
78-87-5	1,2-Dichloropropane	ND	U	ug/m³	8.8	8.8	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
107-06-2	1,2-Dichloroethane	ND	U	ug/m³	7.7	7.7	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
95-50-1	1,2-Dichlorobenzene	ND	U	ug/m³	11	11	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/m³	9.4	9.4	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/m³	14	14	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-35-4	1,1-Dichloroethylene	ND	U	ug/m³	7.6	7.6	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-34-3	1,1-Dichloroethane	ND	U	ug/m³	7.7	7.7	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-69-4	Trichlorofluoromethane (Freon 11)	ND	U	ug/m³	11	11	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
79-00-5	1,1,2-Trichloroethane	ND	U	ug/m³	10	10	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/m³	15	15	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/m³	13	13	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
71-55-6	1,1,1-Trichloroethane	ND	U	ug/m³	10	10	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
75-71-8	Dichlorodifluoromethane	ND	U	ug/m³	9.4	9.4	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
106-93-4	1,2-Dibromoethane	ND	U	ug/m³	15	15	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
124-48-1	Dibromochloromethane	ND	U	ug/m³	15	15	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
80-62-6	Methyl Methacrylate	ND	U	ug/m³	7.8	7.8	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD
108-90-7	Chlorobenzene	ND	U	ug/m³	8.8	8.8	18.74	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 19:42	TD

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: p-Bromofluorobenzene*	*99.7 %*	*70-130*

Sample Information

Client Sample ID: SV-2 (S 04) **York Sample ID:** 13E0710-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND	U	ug/m³	5.2	5.2	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
108-05-4	Vinyl acetate	ND	U	ug/m³	7.2	7.2	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
79-01-6	Trichloroethylene	ND	U	ug/m³	5.5	5.5	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/m³	9.3	9.3	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/m³	8.1	8.1	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
108-88-3	Toluene	**14**	D	ug/m³	7.7	7.7	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
109-99-9	Tetrahydrofuran	ND	U	ug/m³	6.0	6.0	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
127-18-4	Tetrachloroethylene	ND	U	ug/m³	14	14	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
100-42-5	Styrene	ND	U	ug/m³	8.7	8.7	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
115-07-01	Propylene	ND	U	ug/m³	3.5	3.5	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
622-96-8	p-Ethyltoluene	ND	U	ug/m³	50	50	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
179601-23-1	p- & m- Xylenes	ND	U	ug/m³	18	18	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
95-47-6	o-Xylene	ND	U	ug/m³	8.9	8.9	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
110-54-3	n-Hexane	**110**	D	ug/m³	7.2	7.2	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
142-82-5	n-Heptane	**45**	D	ug/m³	8.4	8.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-09-2	Methylene chloride	**10**	D	ug/m³	7.1	7.1	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/m³	7.4	7.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
108-10-1	4-Methyl-2-pentanone	ND	U	ug/m³	8.4	8.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
67-63-0	Isopropanol	ND	U	ug/m³	5.0	5.0	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
87-68-3	Hexachlorobutadiene	ND	U	ug/m³	22	22	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
100-41-4	Ethyl Benzene	ND	U	ug/m³	8.9	8.9	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
141-78-6	Ethyl acetate	ND	U	ug/m³	7.4	7.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
110-82-7	Cyclohexane	ND	U	ug/m³	7.1	7.1	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/m³	9.3	9.3	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/m³	8.1	8.1	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
74-87-3	Chloromethane	ND	U	ug/m³	4.2	4.2	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
67-66-3	Chloroform	ND	U	ug/m³	10	10	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-00-3	Chloroethane	ND	U	ug/m³	5.4	5.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
56-23-5	Carbon tetrachloride	ND	U	ug/m³	6.4	6.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-15-0	Carbon disulfide	ND	U	ug/m³	6.4	6.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
74-83-9	Bromomethane	ND	U	ug/m³	8.0	8.0	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-25-2	Bromoform	ND	U	ug/m³	21	21	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD

Sample Information

Client Sample ID: SV-2 (S 04) **York Sample ID:** 13E0710-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-27-4	Bromodichloromethane	ND	U	ug/m³	13	13	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
100-44-7	Benzyl chloride	ND	U	ug/m³	11	11	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
71-43-2	Benzene	ND	U	ug/m³	6.6	6.6	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
67-64-1	Acetone	**39**	D	ug/m³	4.9	4.9	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
591-78-6	2-Hexanone	ND	U	ug/m³	8.4	8.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
78-93-3	2-Butanone	ND	U	ug/m³	6.0	6.0	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
123-91-1	1,4-Dioxane	ND	U	ug/m³	7.4	7.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
106-46-7	1,4-Dichlorobenzene	ND	U	ug/m³	12	12	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
541-73-1	1,3-Dichlorobenzene	ND	U	ug/m³	12	12	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
106-99-0	1,3-Butadiene	ND	U	ug/m³	8.9	8.9	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/m³	10	10	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
76-14-2	1,2-Dichlorotetrafluoroethane	ND	U	ug/m³	14	14	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
78-87-5	1,2-Dichloropropane	ND	U	ug/m³	9.5	9.5	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
107-06-2	1,2-Dichloroethane	ND	U	ug/m³	8.3	8.3	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
95-50-1	1,2-Dichlorobenzene	ND	U	ug/m³	12	12	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/m³	10	10	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/m³	15	15	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-35-4	1,1-Dichloroethylene	ND	U	ug/m³	8.1	8.1	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-34-3	1,1-Dichloroethane	ND	U	ug/m³	8.3	8.3	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-69-4	Trichlorofluoromethane (Freon 11)	ND	U	ug/m³	12	12	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
79-00-5	1,1,2-Trichloroethane	ND	U	ug/m³	11	11	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/m³	16	16	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/m³	14	14	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
71-55-6	1,1,1-Trichloroethane	ND	U	ug/m³	11	11	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
75-71-8	Dichlorodifluoromethane	ND	U	ug/m³	10	10	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
106-93-4	1,2-Dibromoethane	ND	U	ug/m³	16	16	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
124-48-1	Dibromochloromethane	ND	U	ug/m³	16	16	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
80-62-6	Methyl Methacrylate	ND	U	ug/m³	8.4	8.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD
108-90-7	Chlorobenzene	ND	U	ug/m³	9.4	9.4	20.16	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 20:27	TD

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: p-Bromofluorobenzene*	*102 %*	*70-130*

Sample Information

Client Sample ID: SV-3 (01047) **York Sample ID:** 13E0710-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND	U	ug/m³	5.4	5.4	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
108-05-4	Vinyl acetate	ND	U	ug/m³	7.5	7.5	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
79-01-6	Trichloroethylene	ND	U	ug/m³	5.7	5.7	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/m³	9.6	9.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/m³	8.4	8.4	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
108-88-3	Toluene	ND	U	ug/m³	8.0	8.0	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
109-99-9	Tetrahydrofuran	ND	U	ug/m³	6.2	6.2	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
127-18-4	Tetrachloroethylene	ND	U	ug/m³	14	14	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
100-42-5	Styrene	ND	U	ug/m³	9.0	9.0	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
115-07-01	Propylene	ND	U	ug/m³	3.6	3.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
622-96-8	p-Ethyltoluene	ND	U	ug/m³	52	52	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
179601-23-1	p- & m- Xylenes	ND	U	ug/m³	18	18	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
95-47-6	o-Xylene	ND	U	ug/m³	9.2	9.2	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
110-54-3	n-Hexane	**110**	D	ug/m³	7.5	7.5	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
142-82-5	n-Heptane	**38**	D	ug/m³	8.7	8.7	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-09-2	Methylene chloride	**8.8**	D	ug/m³	7.4	7.4	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/m³	7.6	7.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
108-10-1	4-Methyl-2-pentanone	ND	U	ug/m³	8.7	8.7	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
67-63-0	Isopropanol	ND	U	ug/m³	5.2	5.2	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
87-68-3	Hexachlorobutadiene	ND	U	ug/m³	23	23	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
100-41-4	Ethyl Benzene	ND	U	ug/m³	9.2	9.2	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
141-78-6	Ethyl acetate	ND	U	ug/m³	7.6	7.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
110-82-7	Cyclohexane	ND	U	ug/m³	7.3	7.3	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/m³	9.6	9.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/m³	8.4	8.4	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
74-87-3	Chloromethane	ND	U	ug/m³	4.4	4.4	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
67-66-3	Chloroform	ND	U	ug/m³	10	10	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-00-3	Chloroethane	ND	U	ug/m³	5.6	5.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
56-23-5	Carbon tetrachloride	ND	U	ug/m³	6.7	6.7	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-15-0	Carbon disulfide	ND	U	ug/m³	6.6	6.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
74-83-9	Bromomethane	ND	U	ug/m³	8.2	8.2	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-25-2	Bromoform	ND	U	ug/m³	22	22	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD

Sample Information

Client Sample ID: SV-3 (01047) **York Sample ID:** 13E0710-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-27-4	Bromodichloromethane	ND	U	ug/m³	13	13	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
100-44-7	Benzyl chloride	ND	U	ug/m³	11	11	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
71-43-2	Benzene	ND	U	ug/m³	6.8	6.8	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
67-64-1	Acetone	**89**	D	ug/m³	5.0	5.0	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
591-78-6	2-Hexanone	ND	U	ug/m³	8.7	8.7	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
78-93-3	2-Butanone	ND	U	ug/m³	6.2	6.2	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
123-91-1	1,4-Dioxane	ND	U	ug/m³	7.6	7.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
106-46-7	1,4-Dichlorobenzene	ND	U	ug/m³	13	13	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
541-73-1	1,3-Dichlorobenzene	ND	U	ug/m³	13	13	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
106-99-0	1,3-Butadiene	ND	U	ug/m³	9.2	9.2	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/m³	10	10	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
76-14-2	1,2-Dichlorotetrafluoroethane	ND	U	ug/m³	15	15	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
78-87-5	1,2-Dichloropropane	ND	U	ug/m³	9.8	9.8	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
107-06-2	1,2-Dichloroethane	ND	U	ug/m³	8.6	8.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
95-50-1	1,2-Dichlorobenzene	ND	U	ug/m³	13	13	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/m³	10	10	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/m³	16	16	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-35-4	1,1-Dichloroethylene	ND	U	ug/m³	8.4	8.4	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-34-3	1,1-Dichloroethane	ND	U	ug/m³	8.6	8.6	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-69-4	Trichlorofluoromethane (Freon 11)	ND	U	ug/m³	12	12	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
79-00-5	1,1,2-Trichloroethane	ND	U	ug/m³	12	12	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/m³	16	16	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/m³	15	15	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
71-55-6	1,1,1-Trichloroethane	ND	U	ug/m³	12	12	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
75-71-8	Dichlorodifluoromethane	ND	U	ug/m³	10	10	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
106-93-4	1,2-Dibromoethane	ND	U	ug/m³	16	16	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
124-48-1	Dibromochloromethane	ND	U	ug/m³	17	17	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
80-62-6	Methyl Methacrylate	ND	U	ug/m³	8.7	8.7	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD
108-90-7	Chlorobenzene	ND	U	ug/m³	9.8	9.8	20.83	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:12	TD

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: p-Bromofluorobenzene*	*98.6 %*	*70-130*

Sample Information

Client Sample ID: SV-4 (P-01)

York Sample ID: 13E0710-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND	U	ug/m³	4.5	4.5	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
108-05-4	Vinyl acetate	ND	U	ug/m³	6.2	6.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
79-01-6	Trichloroethylene	**400**	D	ug/m³	4.7	4.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/m³	8.0	8.0	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/m³	7.0	7.0	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
108-88-3	Toluene	**12**	D	ug/m³	6.7	6.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
109-99-9	Tetrahydrofuran	ND	U	ug/m³	5.2	5.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
127-18-4	Tetrachloroethylene	**18**	D	ug/m³	12	12	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
100-42-5	Styrene	ND	U	ug/m³	7.5	7.5	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
115-07-01	Propylene	ND	U	ug/m³	3.0	3.0	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
622-96-8	p-Ethyltoluene	ND	U	ug/m³	43	43	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
179601-23-1	p- & m- Xylenes	ND	U	ug/m³	15	15	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
95-47-6	o-Xylene	ND	U	ug/m³	7.7	7.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
110-54-3	n-Hexane	**120**	D	ug/m³	6.2	6.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
142-82-5	n-Heptane	**43**	D	ug/m³	7.2	7.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-09-2	Methylene chloride	**8.6**	D	ug/m³	6.1	6.1	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/m³	6.4	6.4	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
108-10-1	4-Methyl-2-pentanone	ND	U	ug/m³	7.2	7.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
67-63-0	Isopropanol	ND	U	ug/m³	4.3	4.3	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
87-68-3	Hexachlorobutadiene	ND	U	ug/m³	19	19	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
100-41-4	Ethyl Benzene	ND	U	ug/m³	7.7	7.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
141-78-6	Ethyl acetate	ND	U	ug/m³	6.4	6.4	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
110-82-7	Cyclohexane	ND	U	ug/m³	6.1	6.1	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/m³	8.0	8.0	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/m³	7.0	7.0	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
74-87-3	Chloromethane	ND	U	ug/m³	3.7	3.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
67-66-3	Chloroform	ND	U	ug/m³	8.6	8.6	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-00-3	Chloroethane	ND	U	ug/m³	4.7	4.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
56-23-5	Carbon tetrachloride	ND	U	ug/m³	5.6	5.6	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-15-0	Carbon disulfide	ND	U	ug/m³	5.5	5.5	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
74-83-9	Bromomethane	ND	U	ug/m³	6.9	6.9	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-25-2	Bromoform	ND	U	ug/m³	18	18	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-27-4	Bromodichloromethane	ND	U	ug/m³	11	11	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD

Sample Information

Client Sample ID: SV-4 (P-01) **York Sample ID:** 13E0710-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-44-7	Benzyl chloride	ND	U	ug/m³	9.2	9.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
71-43-2	Benzene	ND	U	ug/m³	5.6	5.6	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
67-64-1	Acetone	**30**	D	ug/m³	4.2	4.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
591-78-6	2-Hexanone	ND	U	ug/m³	7.2	7.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
78-93-3	2-Butanone	ND	U	ug/m³	5.2	5.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
123-91-1	1,4-Dioxane	ND	U	ug/m³	6.4	6.4	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
106-46-7	1,4-Dichlorobenzene	ND	U	ug/m³	11	11	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
541-73-1	1,3-Dichlorobenzene	ND	U	ug/m³	11	11	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
106-99-0	1,3-Butadiene	ND	U	ug/m³	7.7	7.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/m³	8.7	8.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
76-14-2	1,2-Dichlorotetrafluoroethane	ND	U	ug/m³	12	12	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
78-87-5	1,2-Dichloropropane	ND	U	ug/m³	8.2	8.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
107-06-2	1,2-Dichloroethane	ND	U	ug/m³	7.2	7.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
95-50-1	1,2-Dichlorobenzene	ND	U	ug/m³	11	11	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/m³	8.7	8.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/m³	13	13	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-35-4	1,1-Dichloroethylene	ND	U	ug/m³	7.0	7.0	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-34-3	1,1-Dichloroethane	ND	U	ug/m³	7.2	7.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-69-4	Trichlorofluoromethane (Freon 11)	ND	U	ug/m³	9.9	9.9	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
79-00-5	1,1,2-Trichloroethane	ND	U	ug/m³	9.6	9.6	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/m³	14	14	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/m³	12	12	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
71-55-6	1,1,1-Trichloroethane	ND	U	ug/m³	9.6	9.6	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
75-71-8	Dichlorodifluoromethane	ND	U	ug/m³	8.7	8.7	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
106-93-4	1,2-Dibromoethane	ND	U	ug/m³	14	14	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
124-48-1	Dibromochloromethane	ND	U	ug/m³	14	14	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
80-62-6	Methyl Methacrylate	ND	U	ug/m³	7.2	7.2	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD
108-90-7	Chlorobenzene	ND	U	ug/m³	8.1	8.1	17.38	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 21:57	TD

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: p-Bromofluorobenzene*	*103 %*	*70-130*

Sample Information

Client Sample ID: SV-5 (S 18) **York Sample ID:** 13E0710-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND	U	ug/m³	5.5	5.5	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
108-05-4	Vinyl acetate	ND	U	ug/m³	7.5	7.5	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
79-01-6	Trichloroethylene	ND	U	ug/m³	5.7	5.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/m³	9.7	9.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/m³	8.5	8.5	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
108-88-3	Toluene	**13**	D	ug/m³	8.0	8.0	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
109-99-9	Tetrahydrofuran	ND	U	ug/m³	6.3	6.3	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
127-18-4	Tetrachloroethylene	ND	U	ug/m³	14	14	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
100-42-5	Styrene	ND	U	ug/m³	9.1	9.1	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
115-07-01	Propylene	ND	U	ug/m³	3.7	3.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
622-96-8	p-Ethyltoluene	ND	U	ug/m³	52	52	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
179601-23-1	p- & m- Xylenes	ND	U	ug/m³	19	19	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
95-47-6	o-Xylene	ND	U	ug/m³	9.3	9.3	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
110-54-3	n-Hexane	**130**	D	ug/m³	7.5	7.5	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
142-82-5	n-Heptane	**51**	D	ug/m³	8.8	8.8	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-09-2	Methylene chloride	**8.9**	D	ug/m³	7.4	7.4	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/m³	7.7	7.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
108-10-1	4-Methyl-2-pentanone	ND	U	ug/m³	8.7	8.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
67-63-0	Isopropanol	ND	U	ug/m³	5.2	5.2	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
87-68-3	Hexachlorobutadiene	ND	U	ug/m³	23	23	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
100-41-4	Ethyl Benzene	ND	U	ug/m³	9.3	9.3	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
141-78-6	Ethyl acetate	ND	U	ug/m³	7.7	7.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
110-82-7	Cyclohexane	ND	U	ug/m³	7.4	7.4	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/m³	9.7	9.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/m³	8.5	8.5	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
74-87-3	Chloromethane	ND	U	ug/m³	4.4	4.4	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
67-66-3	Chloroform	ND	U	ug/m³	10	10	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-00-3	Chloroethane	ND	U	ug/m³	5.6	5.6	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
56-23-5	Carbon tetrachloride	ND	U	ug/m³	6.7	6.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-15-0	Carbon disulfide	ND	U	ug/m³	6.7	6.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
74-83-9	Bromomethane	ND	U	ug/m³	8.3	8.3	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-25-2	Bromoform	ND	U	ug/m³	22	22	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD

Sample Information

Client Sample ID: SV-5 (S 18) **York Sample ID:** 13E0710-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Soil Vapor	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-27-4	Bromodichloromethane	ND	U	ug/m³	13	13	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
100-44-7	Benzyl chloride	ND	U	ug/m³	11	11	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
71-43-2	Benzene	ND	U	ug/m³	6.8	6.8	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
67-64-1	Acetone	**49**	D	ug/m³	5.1	5.1	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
591-78-6	2-Hexanone	ND	U	ug/m³	8.7	8.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
78-93-3	2-Butanone	ND	U	ug/m³	6.3	6.3	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
123-91-1	1,4-Dioxane	ND	U	ug/m³	7.7	7.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
106-46-7	1,4-Dichlorobenzene	ND	U	ug/m³	13	13	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
541-73-1	1,3-Dichlorobenzene	ND	U	ug/m³	13	13	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
106-99-0	1,3-Butadiene	ND	U	ug/m³	9.3	9.3	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/m³	10	10	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
76-14-2	1,2-Dichlorotetrafluoroethane	ND	U	ug/m³	15	15	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
78-87-5	1,2-Dichloropropane	ND	U	ug/m³	9.9	9.9	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
107-06-2	1,2-Dichloroethane	ND	U	ug/m³	8.6	8.6	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
95-50-1	1,2-Dichlorobenzene	ND	U	ug/m³	13	13	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/m³	10	10	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/m³	16	16	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-35-4	1,1-Dichloroethylene	ND	U	ug/m³	8.5	8.5	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-34-3	1,1-Dichloroethane	ND	U	ug/m³	8.6	8.6	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-69-4	Trichlorofluoromethane (Freon 11)	ND	U	ug/m³	12	12	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
79-00-5	1,1,2-Trichloroethane	ND	U	ug/m³	12	12	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/m³	16	16	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/m³	15	15	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
71-55-6	1,1,1-Trichloroethane	ND	U	ug/m³	12	12	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
75-71-8	Dichlorodifluoromethane	ND	U	ug/m³	11	11	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
106-93-4	1,2-Dibromoethane	ND	U	ug/m³	16	16	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
124-48-1	Dibromochloromethane	ND	U	ug/m³	17	17	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
80-62-6	Methyl Methacrylate	ND	U	ug/m³	8.7	8.7	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD
108-90-7	Chlorobenzene	ND	U	ug/m³	9.8	9.8	21	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 22:41	TD

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: p-Bromofluorobenzene*	*102 %*	*70-130*

Sample Information

Client Sample ID: KIC_AA (10091)

York Sample ID: 13E0710-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Indoor Ambient Air	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-01-4	Vinyl Chloride	ND	U	ug/m³	0.17	0.17	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
108-05-4	Vinyl acetate	ND	U	ug/m³	0.24	0.24	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
79-01-6	Trichloroethylene	ND	U	ug/m³	0.18	0.18	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/m³	0.31	0.31	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/m³	0.27	0.27	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
108-88-3	Toluene	**27**	D	ug/m³	0.26	0.26	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
109-99-9	Tetrahydrofuran	ND	U	ug/m³	0.20	0.20	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
127-18-4	Tetrachloroethylene	**3.7**	D	ug/m³	0.46	0.46	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
100-42-5	Styrene	ND	U	ug/m³	0.29	0.29	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
115-07-01	Propylene	ND	U	ug/m³	0.12	0.12	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
622-96-8	p-Ethyltoluene	ND	U	ug/m³	1.7	1.7	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
179601-23-1	p- & m- Xylenes	**5.6**	D	ug/m³	0.59	0.59	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
95-47-6	o-Xylene	**1.8**	D	ug/m³	0.29	0.29	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
110-54-3	n-Hexane	**24**	D	ug/m³	0.24	0.24	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
142-82-5	n-Heptane	ND	U	ug/m³	0.28	0.28	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-09-2	Methylene chloride	**12**	D	ug/m³	0.24	0.24	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/m³	0.24	0.24	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
108-10-1	4-Methyl-2-pentanone	ND	U	ug/m³	0.28	0.28	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
67-63-0	Isopropanol	**2.7**	D	ug/m³	0.17	0.17	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
87-68-3	Hexachlorobutadiene	ND	U	ug/m³	0.72	0.72	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
100-41-4	Ethyl Benzene	**1.7**	D	ug/m³	0.29	0.29	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
141-78-6	Ethyl acetate	ND	U	ug/m³	0.24	0.24	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
110-82-7	Cyclohexane	**1.3**	D	ug/m³	0.23	0.23	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/m³	0.31	0.31	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/m³	0.27	0.27	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
74-87-3	Chloromethane	ND	U	ug/m³	0.14	0.14	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
67-66-3	Chloroform	ND	U	ug/m³	0.33	0.33	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-00-3	Chloroethane	ND	U	ug/m³	0.18	0.18	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
56-23-5	Carbon tetrachloride	**0.47**	D	ug/m³	0.21	0.21	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-15-0	Carbon disulfide	ND	U	ug/m³	0.21	0.21	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
74-83-9	Bromomethane	ND	U	ug/m³	0.26	0.26	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-25-2	Bromoform	ND	U	ug/m³	0.70	0.70	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-27-4	Bromodichloromethane	ND	U	ug/m³	0.42	0.42	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD

Sample Information

Client Sample ID: KIC_AA (10091)

York Sample ID: 13E0710-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0710	170246501	Indoor Ambient Air	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, EPA TO15 Full List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA TO15 PREP

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
100-44-7	Benzyl chloride	ND	U	ug/m³	0.35	0.35	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
71-43-2	Benzene	**2.0**	D	ug/m³	0.22	0.22	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
67-64-1	Acetone	**16**	D	ug/m³	0.16	0.16	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
591-78-6	2-Hexanone	ND	U	ug/m³	0.28	0.28	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
78-93-3	2-Butanone	**1.4**	D	ug/m³	0.20	0.20	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
123-91-1	1,4-Dioxane	ND	U	ug/m³	0.24	0.24	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
106-46-7	1,4-Dichlorobenzene	**0.41**	U, D	ug/m³	0.41	0.41	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
541-73-1	1,3-Dichlorobenzene	ND	U	ug/m³	0.41	0.41	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
106-99-0	1,3-Butadiene	ND	U	ug/m³	0.29	0.29	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
108-67-8	1,3,5-Trimethylbenzene	**0.37**	D	ug/m³	0.33	0.33	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
76-14-2	1,2-Dichlorotetrafluoroethane	ND	U	ug/m³	0.47	0.47	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
78-87-5	1,2-Dichloropropane	ND	U	ug/m³	0.31	0.31	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
107-06-2	1,2-Dichloroethane	ND	U	ug/m³	0.27	0.27	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
95-50-1	1,2-Dichlorobenzene	ND	U	ug/m³	0.41	0.41	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
95-63-6	1,2,4-Trimethylbenzene	**1.2**	D	ug/m³	0.33	0.33	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/m³	0.50	0.50	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-35-4	1,1-Dichloroethylene	ND	U	ug/m³	0.27	0.27	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-34-3	1,1-Dichloroethane	ND	U	ug/m³	0.27	0.27	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-69-4	Trichlorofluoromethane (Freon 11)	**1.9**	D	ug/m³	0.38	0.38	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
79-00-5	1,1,2-Trichloroethane	ND	U	ug/m³	0.37	0.37	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
76-13-1	1,2-Trichloro-1,2,2-trifluoroethane (Freon 11	**0.62**	D	ug/m³	0.52	0.52	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/m³	0.47	0.47	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
71-55-6	1,1,1-Trichloroethane	ND	U	ug/m³	0.37	0.37	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
75-71-8	Dichlorodifluoromethane	**2.7**	D	ug/m³	0.34	0.34	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
106-93-4	1,2-Dibromoethane	ND	U	ug/m³	0.52	0.52	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
124-48-1	Dibromochloromethane	ND	U	ug/m³	0.54	0.54	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
80-62-6	Methyl Methacrylate	ND	U	ug/m³	0.28	0.28	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD
108-90-7	Chlorobenzene	ND	U	ug/m³	0.31	0.31	0.66666	EPA Compendium TO-15	05/21/2013 09:00	05/22/2013 23:33	TD

	Surrogate Recoveries	Result	Acceptance Range
460-00-4	*Surrogate: p-Bromofluorobenzene*	*98.6 %*	*70-130*

Analytical Batch Summary

Batch ID: BE31148 **Preparation Method:** EPA TO15 PREP **Prepared By:** SR

YORK Sample ID	Client Sample ID	Preparation Date
13E0710-01	SV-1 (SN 01025)	05/21/13
13E0710-02	SV-2 (S 04)	05/21/13
13E0710-03	SV-3 (01047)	05/21/13
13E0710-04	SV-4 (P-01)	05/21/13
13E0710-05	SV-5 (S 18)	05/21/13
13E0710-06	KIC_AA (10091)	05/21/13
BE31148-BLK1	Blank	05/22/13
BE31148-BS1	LCS	05/22/13

Volatile Organic Compounds by EPA Compendium TO14A/TO15 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31148 - EPA TO15 PREP											
Blank (BE31148-BLK1)											Prepared & Analyzed: 05/22/2013
Vinyl Chloride	ND	0.26	ug/m³								
Vinyl acetate	ND	0.36	"								
Trichloroethylene	ND	0.27	"								
trans-1,3-Dichloropropylene	ND	0.46	"								
trans-1,2-Dichloroethylene	ND	0.40	"								
Toluene	ND	0.38	"								
Tetrahydrofuran	ND	0.30	"								
Tetrachloroethylene	ND	0.69	"								
Styrene	ND	0.43	"								
Propylene	ND	0.18	"								
p-Ethyltoluene	ND	2.5	"								
p- & m- Xylenes	ND	0.88	"								
o-Xylene	ND	0.44	"								
n-Hexane	ND	0.36	"								
n-Heptane	ND	0.42	"								
Methylene chloride	ND	0.35	"								
Methyl tert-butyl ether (MTBE)	ND	0.37	"								
4-Methyl-2-pentanone	ND	0.42	"								
Isopropanol	ND	0.25	"								
Hexachlorobutadiene	ND	1.1	"								
Ethyl Benzene	ND	0.44	"								
Ethyl acetate	ND	0.37	"								
Cyclohexane	ND	0.35	"								
cis-1,3-Dichloropropylene	ND	0.46	"								
cis-1,2-Dichloroethylene	ND	0.40	"								
Chloromethane	ND	0.21	"								
Chloroform	ND	0.50	"								
Chloroethane	ND	0.27	"								
Carbon tetrachloride	ND	0.32	"								
Carbon disulfide	ND	0.32	"								
Bromomethane	ND	0.39	"								
Bromoform	ND	1.1	"								
Bromodichloromethane	ND	0.63	"								
Benzyl chloride	ND	0.53	"								
Benzene	ND	0.32	"								
Acetone	ND	0.24	"								
2-Hexanone	ND	0.42	"								
2-Butanone	ND	0.30	"								
1,4-Dioxane	ND	0.37	"								
1,4-Dichlorobenzene	ND	0.61	"								
1,3-Dichlorobenzene	ND	0.61	"								
1,3-Butadiene	ND	0.44	"								
1,3,5-Trimethylbenzene	ND	0.50	"								
1,2-Dichlorotetrafluoroethane	ND	0.71	"								
1,2-Dichloropropane	ND	0.47	"								
1,2-Dichloroethane	ND	0.41	"								
1,2-Dichlorobenzene	ND	0.61	"								
1,2,4-Trimethylbenzene	ND	0.50	"								
1,2,4-Trichlorobenzene	ND	0.75	"								
1,1-Dichloroethylene	ND	0.40	"								
1,1-Dichloroethane	ND	0.41	"								

Volatile Organic Compounds by EPA Compendium TO14A/TO15 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31148 - EPA TO15 PREP											
Blank (BE31148-BLK1)								Prepared & Analyzed: 05/22/2013			
Trichlorofluoromethane (Freon 11)	ND	0.57	ug/m³								
1,1,2-Trichloroethane	ND	0.55	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.78	"								
1,1,2,2-Tetrachloroethane	ND	0.70	"								
1,1,1-Trichloroethane	ND	0.55	"								
Dichlorodifluoromethane	ND	0.50	"								
1,2-Dibromoethane	ND	0.78	"								
Dibromochloromethane	ND	0.82	"								
Methyl Methacrylate	ND	0.42	"								
Chlorobenzene	ND	0.47	"								
Surrogate: p-Bromofluorobenzene	*7.83*		*ppbv*	*10.0*		*78.3*	*70-130*				
LCS (BE31148-BS1)								Prepared & Analyzed: 05/22/2013			
Vinyl Chloride	11.1		ppbv	10.5		106	70-130				
Vinyl acetate	10.7		"	10.4		103	58.1-135				
Trichloroethylene	9.72		"	10.6		91.7	70-130				
trans-1,3-Dichloropropylene	13.2		"	11.5		115	62-135				
trans-1,2-Dichloroethylene	10.1		"	10.3		97.7	58.3-130				
Toluene	12.4		"	11.0		113	64.9-126				
Tetrahydrofuran	11.8		"	10.8		110	44.6-146				
Tetrachloroethylene	10.9		"	10.8		101	70-130				
Styrene	12.1		"	10.9		111	66.4-132				
Propylene	14.8		"	11.5		129	62.4-150				
p-Ethyltoluene	12.8		"	10.4		123	73.8-146				
p- & m- Xylenes	27.0		"	21.8		124	56.6-136				
o-Xylene	13.4		"	11.0		122	67.8-133				
n-Hexane	11.6		"	10.9		106	59.7-130				
n-Heptane	12.4		"	10.9		114	62.3-134				
Methylene chloride	8.43		"	9.70		86.9	62.6-130				
Methyl tert-butyl ether (MTBE)	7.71		"	10.3		74.9	60.7-139				
4-Methyl-2-pentanone	10.7		"	10.6		101	64.5-158				
Isopropanol	1.98		"	10.9		18.2	60-150	Low Bias			
Hexachlorobutadiene	10.2		"	10.2		99.7	61.2-150				
Ethyl Benzene	13.7		"	11.0		125	68.4-125				
Ethyl acetate	13.0		"	11.0		118	40.6-150				
Cyclohexane	11.5		"	10.8		106	60.4-127				
cis-1,3-Dichloropropylene	12.1		"	10.9		111	65.5-129				
cis-1,2-Dichloroethylene	10.0		"	10.8		93.1	51.3-118				
Chloromethane	10.0		"	10.3		97.1	64.9-130				
Chloroform	10.6		"	11.0		95.9	65.1-130				
Chloroethane	10.5		"	10.3		102	52.1-131				
Carbon tetrachloride	9.31		"	10.5		88.7	70-130				
Carbon disulfide	10.2		"	10.5		97.3	61.8-111				
Bromomethane	10.1		"	10.5		96.4	60.1-140				
Bromoform	13.1		"	10.9		121	58.7-150				
Bromodichloromethane	10.4		"	10.6		97.9	65.3-127				
Benzyl chloride	13.6		"	10.8		126	62.5-150				
Benzene	10.8		"	10.8		99.6	69.5-130				
Acetone	11.5		"	11.0		104	55.3-133				
2-Hexanone	7.37		"	10.9		67.6	52-150				
2-Butanone	12.4		"	10.9		114	28.5-154				
1,4-Dioxane	11.6		"	10.6		110	50-150				

Volatile Organic Compounds by EPA Compendium TO14A/TO15 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31148 - EPA TO15 PREP											
LCS (BE31148-BS1)								Prepared & Analyzed: 05/22/2013			
1,4-Dichlorobenzene	14.0		ppbv	10.9		128	62.5-139				
1,3-Dichlorobenzene	13.8		"	10.8		128	71.9-153				
1,3-Butadiene	11.2		"	10.9		102	66.7-127				
1,3,5-Trimethylbenzene	13.2		"	11.0		120	65-152				
1,2-Dichlorotetrafluoroethane	10.5		"	10.5		100	63.3-129				
1,2-Dichloropropane	11.2		"	11.0		102	21.3-152				
1,2-Dichloroethane	10.4		"	10.7		97.5	51.2-124				
1,2-Dichlorobenzene	13.4		"	10.7		125	63.7-148				
1,2,4-Trimethylbenzene	12.9		"	11.0		118	67.9-152				
1,2,4-Trichlorobenzene	9.07		"	10.0		90.7	58-147				
1,1-Dichloroethylene	9.33		"	9.60		97.2	58.1-130				
1,1-Dichloroethane	9.96		"	10.3		96.7	63.3-130				
Trichlorofluoromethane (Freon 11)	10.1		"	11.0		92.1	56-132				
1,1,2-Trichloroethane	11.4		"	11.0		104	66-127				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	8.63		"	9.20		93.8	60.2-125				
1,1,2,2-Tetrachloroethane	13.4		"	11.0		122	63.7-132				
1,1,1-Trichloroethane	10.1		"	10.5		96.1	58.2-126				
Dichlorodifluoromethane	10.4		"	10.2		101	62.8-133				
1,2-Dibromoethane	11.9		"	11.0		108	70-130				
Dibromochloromethane	10.9		"	10.7		102	70-130				
Methyl Methacrylate	10.4		"	10.7		96.7	70-130				
Chlorobenzene	12.4		"	11.0		112	67.6-122				
Surrogate: p-Bromofluorobenzene	*10.5*		*"*	*10.0*		*105*	*70-130*				

Notes and Definitions

U	Analyte included in the analysis, but not detected
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
D	The result reported is from a dilution of the sample due to levels of target compounds found

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ND	Analyte NOT DETECTED at the stated Reporting Limit (RL) or above.
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
MDL	METHOD DETECTION LIMIT - the minimum concentration that can be measured and reported with a 99% confidence that the concentration is greater than zero. If requested or required, a value reported below the RL and above the MDL is considered estimated and is noted with a "J" flag.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two.
For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the MDL, with values between the MDL and the RL being "J" flagged as estimated results.

YORK
ANALYTICAL LABORATORIES, INC.
120 RESEARCH DR. STRATFORD, CT 06615
(203) 325-1371 FAX (203) 357-0166

Field Chain-of-Custody Record - AIR

NOTE: York's Std. Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions unless superseded by written contract.

York Project No. 13E0710

YOUR Information

Company: Langan Engineering
Address: 30 W 31st St 8th Fl NY, NY 10001
Phone No. (212) 479-5400
Contact Person: Brandon Nathe
E-Mail Address: BNathe@langan.com

Report To:

Company: SAME
Address:
Phone No.
Attention: Paul McMahon
E-Mail Address: PMcMahon@langan.com

Invoice To:

Company: SAME
Address:
Phone No.
Attention:
E-Mail Address:

YOUR Project ID

170246501

Purchase Order No.

Samples from: CT ___ NY ✓ NJ ___

Turn-Around Time

- RUSH - Same Day ☐
- RUSH - Next Day ☐
- RUSH - Two Day ☐
- RUSH - Three Day ☐
- RUSH - Four Day ☑
- Standard(5-7 Days) ☐

Report Type/Deliverables

- Summary Report ✓
- Summary w/ QA Summary
- CT RCP Package
- NY ASP A Package
- NY ASP B/CLP Pkg ✓
- NJDEP Reduced
- *Electronic Deliverables:*
- EDD (Specify Type) NYSDEC
- Standard Excel X
- Regulatory Comparison Excel

Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

Paul McMahon
Samples Collected/Authorized By (Signature)

Paul McMahon
Name (printed)

Air Matrix Codes

- AI - INDOOR Ambient Air
- AO- OUTDOOR Amb. Air
- AE- Vapor Extraction Well/ Process Gas/Effluent
- AS- SOIL Vapor/Sub-Slab

TO15 Volatiles and Other Gas Analyses

- EPA TO-15 List
- NYSDEC VI list
- NYSDEC STARS List
- Project Specific List by TO-15
- NJDEP Target List
- CTDEP RCP Target List
- EPA TO-14A List
- Tentatively Identified Compounds
- Air VPH
- Helium
- Methane
- OTHER

Detection Limits Required

- ≤ 1 ug/m³
- NYSDEC VI Limits (VI = vapor intrusion)
- NJDEP low level
- Routine Survey
- Other

Special Instructions

Sample Identification	Date Sampled	AIR Matrix	Canister Vacuum Before Sampling (in. Hg)	Canister Vacuum After Sampling (in. Hg)	Choose Analyses Needed from the Menu Above and Enter Below	Sampling Media
SV-1 (SN01025)	5/20/13	AS	-32	-8	EPA TO-15 List	6 Liter Summa canister X Tedlar Bag
SV-2 (S04)	↓	↓	-29	-5	↓	6 Liter Summa canister X Tedlar Bag
SV-3 (01047)			-29.5	-7		6 Liter Summa canister X Tedlar Bag
SV-4 (P-01)			-32	-5		6 Liter Summa canister X Tedlar Bag
SV-5 (S18)		↓	-28	-6		6 Liter Summa canister X Tedlar Bag
KIC_AA (10091)	↓	AI	-32	-5	↓	6 Liter Summa canister X Tedlar Bag
						6 Liter Summa canister ___ Tedlar Bag
						6 Liter Summa canister ___ Tedlar Bag
						6 Liter Summa canister ___ Tedlar Bag
						6 Liter Summa canister ___ Tedlar Bag

Comments

Paul McMahon 5/21/13 8:00
Samples Relinquished By Date/Time

Samples Relinquished By Date/Time

RBaker 5-21-13 8AM
Samples Received By Date/Time

DSpace 5-21-13 1645
Samples Received in LAB by Date/Time

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Report Date: 05/28/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0711

Report Date: 05/28/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0711

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on May 21, 2013 and listed below. The project was identified as your project: **170246501**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the attachment to this report, and case narrative if applicable.

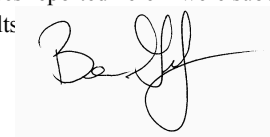
The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
13E0711-01	MW-7 (1-5)	Soil	05/20/2013	05/21/2013
13E0711-02	MW-7 (7-9)	Soil	05/20/2013	05/21/2013
13E0711-03	MW-9 (0-2)	Soil	05/20/2013	05/21/2013
13E0711-04	MW-9 (6-8)	Soil	05/20/2013	05/21/2013
13E0711-05	MW-6 (0-2)	Soil	05/20/2013	05/21/2013
13E0711-06	MW-6 (9-11)	Soil	05/20/2013	05/21/2013
13E0711-07	MW-8 (0.5-2.5)	Soil	05/20/2013	05/21/2013
13E0711-08	MW-8 (7.5-9.5)	Soil	05/20/2013	05/21/2013
13E0711-09	TB-052113	Water	05/21/2013	05/21/2013

General Notes for York Project (SDG) No.: 13E0711

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation, unless otherwise noted.
6. All analyses conducted met method or Laboratory SOP requirements. See the Qualifiers and/or Narrative sections for further information.
7. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
8. This report reflects results ples submitted on the attached chain-of-custody form(s) received by York.

Approved By:  **Date:** 05/28/2013

Benjamin Gulizia
Laboratory Director

YORK

Sample Information

Client Sample ID: MW-7 (1-5) **York Sample ID:** 13E0711-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:25 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
76-13-1	1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.070	0.14	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0035	0.014	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS

Sample Information

Client Sample ID: MW-7 (1-5) **York Sample ID:** 13E0711-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:25 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-83-9	Bromomethane	**0.019**		mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-09-2	Methylene chloride	**0.022**		mg/kg dry	0.0035	0.014	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0035	0.014	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0070	0.014	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS

Sample Information

Client Sample ID: MW-7 (1-5) **York Sample ID:** 13E0711-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:25 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.011	0.021	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0035	0.0070	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:04	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*126 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*99.7 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*117 %*	*84-117*

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.496	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.658	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.784	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.749	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
56-55-3	Benzo(a)anthracene	**0.554**	J, D	mg/kg dry	0.513	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
50-32-8	Benzo(a)pyrene	**0.729**	J, D	mg/kg dry	0.543	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	1.15	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.455	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	1.37	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	1.37	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.757	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.661	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.924	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.357	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.472	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.699	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.483	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.946	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.740	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.452	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.804	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
218-01-9	Chrysene	**0.655**	J, D	mg/kg dry	0.631	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.551	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.639	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR

Sample Information

Client Sample ID: MW-7 (1-5) **York Sample ID:** 13E0711-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:25 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.557	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.897	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.845	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.433	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.719	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	1.12	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.861	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.960	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.612	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	1.73	2.74	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	1.20	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	1.15	2.74	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.705	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.606	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	1.37	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
206-44-0	Fluoranthene	**1.04**	J, D	mg/kg dry	0.804	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.658	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.809	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.463	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	1.02	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.392	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.625	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.472	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	1.05	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.521	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.595	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.337	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	1.36	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.568	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.403	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.516	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.373	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR

Sample Information

Client Sample ID: MW-7 (1-5) **York Sample ID:** 13E0711-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:25 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.458	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.562	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.620	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	1.03	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
85-01-8	Phenanthrene	**0.941**	J, D	mg/kg dry	0.716	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.592	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
129-00-0	Pyrene	**1.30**	J, D	mg/kg dry	0.559	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.963	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.496	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	1.06	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.697	1.37	5	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 15:34	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*68.5 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*75.2 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*52.4 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*61.6 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*65.8 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*103 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.137	0.137	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.0136	0.0136	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW

Sample Information

Client Sample ID: MW-7 (1-5) **York Sample ID:** 13E0711-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:25 pm	05/21/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.0109	0.0109	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
50-29-3	4,4'-DDT	**0.0120**	D	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
72-55-9	4,4'-DDE	**0.00722**	D	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00271	0.00271	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:38	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0280	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0280	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0280	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0280	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0280	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0280	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0280	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.0112	0.0280	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:15	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*66.3 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*50.8 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**18700**		mg/kg dry	1.12	2.19	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.241	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-38-2	Arsenic	**6.39**		mg/kg dry	0.373	1.10	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-39-3	Barium	**558**		mg/kg dry	0.143	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.110	0.110	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-43-9	Cadmium	**1.17**		mg/kg dry	0.110	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-70-2	Calcium	**7470**		mg/kg dry	0.044	5.48	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-47-3	Chromium	**25.1**		mg/kg dry	0.132	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-48-4	Cobalt	**16.7**		mg/kg dry	0.088	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-50-8	Copper	**50.1**		mg/kg dry	0.132	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7439-89-6	Iron	**42500**	E	mg/kg dry	0.713	2.19	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7439-92-1	Lead	**392**		mg/kg dry	0.186	0.329	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7439-95-4	Magnesium	**11700**		mg/kg dry	0.494	5.48	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW

Sample Information

Client Sample ID: MW-7 (1-5) **York Sample ID:** 13E0711-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:25 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-96-5	Manganese	**432**		mg/kg dry	0.121	1.10	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-02-0	Nickel	**24.3**		mg/kg dry	0.143	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-09-7	Potassium	**12300**	B	mg/kg dry	3.71	11.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.548	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.110	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-23-5	Sodium	**326**	B	mg/kg dry	5.78	11.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.351	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-62-2	Vanadium	**64.0**		mg/kg dry	0.121	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW
7440-66-6	Zinc	**501**		mg/kg dry	0.099	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:09	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0362	0.0362	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**91.2**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: MW-7 (7-9) **York Sample ID:** 13E0711-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:35 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS

Sample Information

Client Sample ID: MW-7 (7-9) **York Sample ID:** 13E0711-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:35 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.048	0.096	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0024	0.0096	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS

Sample Information

Client Sample ID: MW-7 (7-9) **York Sample ID:** 13E0711-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:35 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-09-2	Methylene chloride	**0.011**		mg/kg dry	0.0024	0.0096	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0024	0.0096	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0048	0.0096	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0072	0.014	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0024	0.0048	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 05:52	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*107 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*100 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*99.5 %*	*84-117*

Sample Information

Client Sample ID: MW-7 (7-9) **York Sample ID:** 13E0711-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:35 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0993	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.132	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.157	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.150	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.103	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.109	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.230	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0910	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.274	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.274	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.151	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.132	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.185	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0713	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0943	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.140	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0965	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.189	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.148	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0905	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.161	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.126	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.110	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.128	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.111	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.179	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.169	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0866	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.144	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.224	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.172	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.192	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR

Sample Information

Client Sample ID: MW-7 (7-9) **York Sample ID:** 13E0711-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:35 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.122	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.345	0.548	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.239	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.230	0.548	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.141	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.121	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.274	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.161	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.132	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.162	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0927	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.204	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0784	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.125	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0943	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.211	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.104	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.119	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0674	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.273	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.114	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0806	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.103	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0746	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0916	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.112	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.124	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.207	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.143	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.118	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.112	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.192	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR

Sample Information

Client Sample ID: MW-7 (7-9) **York Sample ID:** 13E0711-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:35 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0993	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.213	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.139	0.274	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:05	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*78.1 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*65.8 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*52.9 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*41.3 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*66.7 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*108 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0280	0.0280	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 10:44	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*60.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*43.3 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**9940**		mg/kg dry	1.12	2.19	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.241	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-38-2	Arsenic	**2.65**		mg/kg dry	0.373	1.10	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-39-3	Barium	**143**		mg/kg dry	0.143	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.110	0.110	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.110	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-70-2	Calcium	**2980**		mg/kg dry	0.044	5.48	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW

Sample Information

Client Sample ID: MW-7 (7-9) **York Sample ID:** 13E0711-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 1:35 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**17.0**		mg/kg dry	0.132	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-48-4	Cobalt	**9.04**		mg/kg dry	0.088	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-50-8	Copper	**12.9**		mg/kg dry	0.132	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7439-89-6	Iron	**16900**		mg/kg dry	0.713	2.19	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7439-92-1	Lead	**9.87**		mg/kg dry	0.186	0.329	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7439-95-4	Magnesium	**5410**		mg/kg dry	0.494	5.48	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7439-96-5	Manganese	**215**		mg/kg dry	0.121	1.10	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-02-0	Nickel	**15.8**		mg/kg dry	0.143	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-09-7	Potassium	**3820**	B	mg/kg dry	3.71	11.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.548	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.110	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-23-5	Sodium	**188**	B	mg/kg dry	5.78	11.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.351	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-62-2	Vanadium	**36.6**		mg/kg dry	0.121	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW
7440-66-6	Zinc	**49.3**		mg/kg dry	0.099	0.548	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:14	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0362	0.0362	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**91.2**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
76-13-1	1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.053	0.11	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0026	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-09-2	Methylene chloride	**0.014**		mg/kg dry	0.0026	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0026	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0053	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0079	0.016	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0026	0.0053	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 06:40	SS

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*112 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*98.7 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*99.6 %*		*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0999	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.132	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.158	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.151	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
56-55-3	Benzo(a)anthracene	**0.361**		mg/kg dry	0.103	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
50-32-8	Benzo(a)pyrene	**0.447**		mg/kg dry	0.109	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
205-99-2	Benzo(b)fluoranthene	**0.421**		mg/kg dry	0.231	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
191-24-2	Benzo(g,h,i)perylene	**0.105**	J	mg/kg dry	0.0916	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.276	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
207-08-9	Benzo(k)fluoranthene	**0.369**		mg/kg dry	0.276	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.152	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.133	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.186	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0717	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0949	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.141	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0971	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.190	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.149	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0910	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.162	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
218-01-9	Chrysene	**0.404**		mg/kg dry	0.127	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.111	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.129	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.112	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.180	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.170	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0872	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.145	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.225	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.173	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.193	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.123	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.241	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.348	0.552	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.232	0.552	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.142	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.122	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.276	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
206-44-0	Fluoranthene	**0.622**		mg/kg dry	0.162	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.132	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.163	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0932	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.205	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0789	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
193-39-5	Indeno(1,2,3-cd)pyrene	**0.134**	J	mg/kg dry	0.126	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0949	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.212	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.105	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.120	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0679	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.274	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.114	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0811	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.104	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0750	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0921	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.113	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.125	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.208	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
85-01-8	Phenanthrene	**0.424**		mg/kg dry	0.144	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.119	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
129-00-0	Pyrene	**0.803**		mg/kg dry	0.113	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.194	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0999	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.214	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.140	0.276	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 16:36	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*64.1 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*51.8 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*44.4 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*37.9 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*54.5 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*98.7 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.138	0.138	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.0137	0.0137	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.0109	0.0109	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00273	0.00273	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 10:53	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0281	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0281	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0281	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0281	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0281	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0281	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0281	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.0113	0.0281	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:43	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*101 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*88.1 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**12200**		mg/kg dry	1.13	2.21	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.243	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-38-2	Arsenic	**3.39**		mg/kg dry	0.375	1.10	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-39-3	Barium	**99.6**		mg/kg dry	0.143	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.110	0.110	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.110	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-70-2	Calcium	**11200**		mg/kg dry	0.044	5.52	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-47-3	Chromium	**25.4**		mg/kg dry	0.132	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-48-4	Cobalt	**9.93**		mg/kg dry	0.088	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-50-8	Copper	**26.7**		mg/kg dry	0.132	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7439-89-6	Iron	**24100**	E	mg/kg dry	0.717	2.21	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7439-92-1	Lead	**79.5**		mg/kg dry	0.188	0.331	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7439-95-4	Magnesium	**6270**		mg/kg dry	0.497	5.52	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7439-96-5	Manganese	**267**		mg/kg dry	0.121	1.10	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-02-0	Nickel	**20.9**		mg/kg dry	0.143	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW

Sample Information

Client Sample ID: MW-9 (0-2) **York Sample ID:** 13E0711-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:35 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-09-7	Potassium	**3010**	B	mg/kg dry	3.73	11.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.552	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.110	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-23-5	Sodium	**339**	B	mg/kg dry	5.82	11.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.353	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-62-2	Vanadium	**36.8**		mg/kg dry	0.121	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW
7440-66-6	Zinc	**76.2**		mg/kg dry	0.099	0.552	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:30	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0364	0.0364	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**90.6**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: MW-9 (6-8) **York Sample ID:** 13E0711-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:45 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS

Sample Information

Client Sample ID: MW-9 (6-8) **York Sample ID:** 13E0711-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:45 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.052	0.10	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
74-83-9	Bromomethane	**0.0065**		mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS

Sample Information

Client Sample ID: MW-9 (6-8) **York Sample ID:** 13E0711-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:45 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-09-2	Methylene chloride	**0.015**		mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0052	0.010	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0079	0.016	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 07:29	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*101 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*93.7 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*99.9 %*	*84-117*

Sample Information

Client Sample ID: MW-9 (6-8) **York Sample ID:** 13E0711-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:45 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.108	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.144	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.171	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.163	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.112	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.118	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.251	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0993	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.299	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.299	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.165	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.144	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.202	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0777	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.103	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.152	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.105	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.206	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.161	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0987	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.175	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.138	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.120	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.139	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.121	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.196	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.184	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0945	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.157	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.244	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.188	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.209	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR

Sample Information

Client Sample ID: MW-9 (6-8) **York Sample ID:** 13E0711-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:45 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.133	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.261	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.377	0.598	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.251	0.598	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.154	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.132	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.299	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.175	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.144	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.176	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.101	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.222	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0855	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.136	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.103	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.230	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.114	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.130	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0736	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.297	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.124	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0879	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.112	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0813	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0999	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.123	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.135	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.225	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.156	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.129	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.122	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.210	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR

Sample Information

Client Sample ID: MW-9 (6-8) **York Sample ID:** 13E0711-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:45 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.108	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.232	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.152	0.299	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:08	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*64.2 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*56.0 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*41.0 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*33.5 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*54.2 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*92.0 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0305	0.0305	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 12:12	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*80.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*78.6 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**9140**		mg/kg dry	1.22	2.39	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.263	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-38-2	Arsenic	**3.99**		mg/kg dry	0.407	1.20	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-39-3	Barium	**53.6**		mg/kg dry	0.155	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.120	0.120	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.120	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-70-2	Calcium	**10800**		mg/kg dry	0.048	5.98	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW

Sample Information

Client Sample ID: MW-9 (6-8) **York Sample ID:** 13E0711-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:45 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**23.0**		mg/kg dry	0.144	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-48-4	Cobalt	**9.20**		mg/kg dry	0.096	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-50-8	Copper	**20.9**		mg/kg dry	0.144	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7439-89-6	Iron	**16300**		mg/kg dry	0.777	2.39	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7439-92-1	Lead	**7.59**		mg/kg dry	0.203	0.359	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7439-95-4	Magnesium	**9030**		mg/kg dry	0.538	5.98	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7439-96-5	Manganese	**219**		mg/kg dry	0.132	1.20	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-02-0	Nickel	**21.2**		mg/kg dry	0.155	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-09-7	Potassium	**2570**	B	mg/kg dry	4.04	12.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.598	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.120	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-23-5	Sodium	**301**	B	mg/kg dry	6.30	12.0	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.383	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-62-2	Vanadium	**35.3**		mg/kg dry	0.132	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW
7440-66-6	Zinc	**46.1**		mg/kg dry	0.108	0.598	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:34	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0395	0.0395	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**83.6**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.060	0.12	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0030	0.012	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-09-2	Methylene chloride	**0.014**		mg/kg dry	0.0030	0.012	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0030	0.012	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0060	0.012	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0090	0.018	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0030	0.0060	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 08:17	SS

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*116 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*112 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*125 %*	*S-04*	*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0971	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.129	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.153	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.146	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
56-55-3	Benzo(a)anthracene	**0.243**	J	mg/kg dry	0.100	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
50-32-8	Benzo(a)pyrene	**0.326**		mg/kg dry	0.106	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.225	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0891	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.268	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
207-08-9	Benzo(k)fluoranthene	**0.290**		mg/kg dry	0.268	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.148	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.129	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.181	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0697	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0923	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.137	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0944	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.185	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.145	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0885	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.157	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
218-01-9	Chrysene	**0.312**		mg/kg dry	0.123	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.108	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.125	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.109	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.175	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.165	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0848	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.141	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.219	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.168	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.188	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.120	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.338	0.537	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.234	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.225	0.537	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.138	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.119	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.268	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
206-44-0	Fluoranthene	**0.362**		mg/kg dry	0.157	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.129	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.158	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0907	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.200	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0767	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.122	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0923	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.206	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.102	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.116	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0660	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.267	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.111	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0789	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.101	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0730	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0896	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.110	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.121	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.202	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
85-01-8	Phenanthrene	**0.167**	J	mg/kg dry	0.140	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.116	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
129-00-0	Pyrene	**0.486**		mg/kg dry	0.109	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.188	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0971	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.208	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.136	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 17:39	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*63.7 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*52.2 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*26.7 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*33.8 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*43.4 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*98.8 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.134	0.134	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.0133	0.0133	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.0106	0.0106	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:23	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.0109	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 12:41	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*70.6 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*63.4 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**8150**		mg/kg dry	1.09	2.15	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.236	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-38-2	Arsenic	**3.66**		mg/kg dry	0.365	1.07	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-39-3	Barium	**244**		mg/kg dry	0.139	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.107	0.107	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.107	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-70-2	Calcium	**7170**		mg/kg dry	0.043	5.37	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-47-3	Chromium	**25.6**		mg/kg dry	0.129	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-48-4	Cobalt	**8.14**		mg/kg dry	0.086	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-50-8	Copper	**29.6**		mg/kg dry	0.129	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7439-89-6	Iron	**13900**		mg/kg dry	0.697	2.15	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7439-92-1	Lead	**134**		mg/kg dry	0.182	0.322	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7439-95-4	Magnesium	**5180**		mg/kg dry	0.483	5.37	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7439-96-5	Manganese	**210**		mg/kg dry	0.118	1.07	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-02-0	Nickel	**21.4**		mg/kg dry	0.139	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW

Sample Information

Client Sample ID: MW-6 (0-2) **York Sample ID:** 13E0711-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:00 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-09-7	Potassium	**2220**	B	mg/kg dry	3.63	10.7	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.537	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.107	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-23-5	Sodium	**284**	B	mg/kg dry	5.65	10.7	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.343	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-62-2	Vanadium	**27.4**		mg/kg dry	0.118	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW
7440-66-6	Zinc	**112**		mg/kg dry	0.097	0.537	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:39	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0354	0.0354	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**93.2**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: MW-6 (9-11) **York Sample ID:** 13E0711-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:18 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS

Sample Information

Client Sample ID: MW-6 (9-11) **York Sample ID:** 13E0711-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:18 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.054	0.11	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
74-83-9	Bromomethane	**0.011**		mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS

Sample Information

Client Sample ID: MW-6 (9-11) **York Sample ID:** 13E0711-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:18 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-09-2	Methylene chloride	**0.017**		mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0054	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0081	0.016	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 09:53	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*109 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*89.4 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*102 %*	*84-117*

Sample Information

Client Sample ID: MW-6 (9-11) **York Sample ID:** 13E0711-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:18 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.107	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.141	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.168	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.161	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.110	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.117	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.247	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0977	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.294	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.294	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.162	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.142	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.198	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0765	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.101	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.150	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.104	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.203	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.159	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0971	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.172	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.135	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.118	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.137	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.119	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.192	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.181	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0930	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.154	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.240	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.185	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.206	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR

Sample Information

Client Sample ID: MW-6 (9-11) **York Sample ID:** 13E0711-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:18 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.131	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.371	0.588	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.257	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.247	0.588	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.151	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.130	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.294	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.172	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.141	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.174	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0994	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.219	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0841	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.134	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.101	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.226	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.112	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.128	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0724	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.292	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.122	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0865	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.111	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0800	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0983	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.121	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.133	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.222	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.154	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.127	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.120	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.207	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR

Sample Information

Client Sample ID: MW-6 (9-11) **York Sample ID:** 13E0711-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:18 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.107	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.228	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.149	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:10	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*54.8 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*49.9 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*35.0 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*34.1 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*46.3 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*91.4 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 13:11	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*75.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*77.6 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**5460**		mg/kg dry	1.20	2.35	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.259	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-38-2	Arsenic	**6.06**		mg/kg dry	0.400	1.18	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-39-3	Barium	**52.1**		mg/kg dry	0.153	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.118	0.118	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.118	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-70-2	Calcium	**9570**		mg/kg dry	0.047	5.88	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW

Sample Information

Client Sample ID: MW-6 (9-11) **York Sample ID:** 13E0711-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 3:18 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**13.4**		mg/kg dry	0.141	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-48-4	Cobalt	**6.35**		mg/kg dry	0.094	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-50-8	Copper	**12.7**		mg/kg dry	0.141	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7439-89-6	Iron	**10800**		mg/kg dry	0.765	2.35	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7439-92-1	Lead	**4.57**		mg/kg dry	0.200	0.353	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7439-95-4	Magnesium	**7160**		mg/kg dry	0.530	5.88	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7439-96-5	Manganese	**286**		mg/kg dry	0.129	1.18	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-02-0	Nickel	**23.6**		mg/kg dry	0.153	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-09-7	Potassium	**1500**	B	mg/kg dry	3.98	11.8	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.588	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.118	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-23-5	Sodium	**219**	B	mg/kg dry	6.20	11.8	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.377	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-62-2	Vanadium	**18.2**		mg/kg dry	0.129	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW
7440-66-6	Zinc	**27.2**		mg/kg dry	0.106	0.588	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:43	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0388	0.0388	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**85.0**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
76-13-1	1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.057	0.11	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0029	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
74-83-9	Bromomethane	**0.012**		mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-09-2	Methylene chloride	**0.016**		mg/kg dry	0.0029	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0029	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0057	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0086	0.017	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0029	0.0057	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 10:41	SS

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*119 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*94.7 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*105 %*		*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0971	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.129	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.153	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.146	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
56-55-3	Benzo(a)anthracene	**0.570**		mg/kg dry	0.100	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
50-32-8	Benzo(a)pyrene	**0.689**		mg/kg dry	0.106	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
205-99-2	Benzo(b)fluoranthene	**0.505**		mg/kg dry	0.225	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
191-24-2	Benzo(g,h,i)perylene	**0.0896**	J	mg/kg dry	0.0891	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.268	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
207-08-9	Benzo(k)fluoranthene	**0.617**		mg/kg dry	0.268	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.148	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.129	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.181	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0697	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0923	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.137	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0944	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.185	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.145	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0885	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.157	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
218-01-9	Chrysene	**0.633**		mg/kg dry	0.123	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.108	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.125	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.109	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.175	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.165	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0848	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.141	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.219	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.168	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.188	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.120	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.234	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.338	0.536	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.225	0.536	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.138	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.119	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.268	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
206-44-0	Fluoranthene	**0.941**		mg/kg dry	0.157	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.129	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.158	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0907	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.200	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0767	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
193-39-5	Indeno(1,2,3-cd)pyrene	**0.140**	J	mg/kg dry	0.122	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0923	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.206	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.102	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.116	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0660	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.267	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.111	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0789	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.101	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0730	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0896	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.110	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.121	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.202	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
85-01-8	Phenanthrene	**0.667**		mg/kg dry	0.140	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.116	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
129-00-0	Pyrene	**1.20**		mg/kg dry	0.109	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.188	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0971	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.208	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.136	0.268	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 18:41	SR

	Surrogate Recoveries	Result		Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*69.4 %*		*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*54.5 %*		*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*33.0 %*		*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*27.9 %*	*S-BN*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*47.9 %*		*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*100 %*		*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.134	0.134	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.0133	0.0133	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.0106	0.0106	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00266	0.00266	5	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 11:38	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0274	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.0109	0.0274	1	EPA SW 846-8081/8082	05/22/2013 14:35	05/23/2013 13:40	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*84.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*65.0 %*	*30-150*

Metals, Target Analyte

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**12700**		mg/kg dry	1.09	2.15	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.236	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-38-2	Arsenic	**4.65**		mg/kg dry	0.365	1.07	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-39-3	Barium	**226**		mg/kg dry	0.139	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.107	0.107	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.107	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-70-2	Calcium	**11200**		mg/kg dry	0.043	5.36	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-47-3	Chromium	**19.7**		mg/kg dry	0.129	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-48-4	Cobalt	**11.7**		mg/kg dry	0.086	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-50-8	Copper	**27.6**		mg/kg dry	0.129	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7439-89-6	Iron	**26100**	E	mg/kg dry	0.697	2.15	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7439-92-1	Lead	**155**		mg/kg dry	0.182	0.322	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7439-95-4	Magnesium	**6690**		mg/kg dry	0.483	5.36	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7439-96-5	Manganese	**321**		mg/kg dry	0.118	1.07	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-02-0	Nickel	**21.5**		mg/kg dry	0.139	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW

Sample Information

Client Sample ID: MW-8 (0.5-2.5) **York Sample ID:** 13E0711-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:00 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-09-7	Potassium	**5340**	B	mg/kg dry	3.63	10.7	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7782-49-2	Selenium	**1.39**		mg/kg dry	0.536	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.107	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-23-5	Sodium	**426**	B	mg/kg dry	5.65	10.7	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.343	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-62-2	Vanadium	**47.9**		mg/kg dry	0.118	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW
7440-66-6	Zinc	**203**		mg/kg dry	0.097	0.536	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:48	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0354	0.0354	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**93.2**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: MW-8 (7.5-9.5) **York Sample ID:** 13E0711-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:10 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS

Sample Information

Client Sample ID: MW-8 (7.5-9.5) **York Sample ID:** 13E0711-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:10 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.054	0.11	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
74-83-9	Bromomethane	**0.0059**		mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS

Sample Information

Client Sample ID: **MW-8 (7.5-9.5)** **York Sample ID:** **13E0711-08**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:10 pm	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-09-2	Methylene chloride	**0.016**		mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0054	0.011	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0081	0.016	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/22/2013 14:10	05/23/2013 11:29	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*124 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*94.4 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*104 %*	*84-117*

Sample Information

Client Sample ID: MW-8 (7.5-9.5) **York Sample ID:** 13E0711-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:10 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.107	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.141	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.168	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.161	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.110	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.117	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.247	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0977	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.294	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.294	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.163	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.142	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.198	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0765	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.101	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.150	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.104	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.203	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.159	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0972	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.173	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.135	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.118	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.137	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.120	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.193	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.181	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0930	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.154	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.240	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.185	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.206	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR

Sample Information

Client Sample ID: MW-8 (7.5-9.5) **York Sample ID:** 13E0711-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:10 pm	05/21/2013

Semi-Volatiles, 8270 Target List **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.131	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.257	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.371	0.589	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.247	0.589	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.151	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.130	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.294	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.173	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.141	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.174	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0995	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.219	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0842	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.134	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.101	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.226	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.112	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.128	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0724	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.293	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.122	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0866	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.111	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0801	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0983	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.121	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.133	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.222	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.154	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.127	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.120	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.207	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR

Sample Information

Client Sample ID: MW-8 (7.5-9.5) **York Sample ID:** 13E0711-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:10 pm	05/21/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.107	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.228	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.150	0.294	1	EPA SW-846 8270C	05/22/2013 14:29	05/23/2013 19:12	SR

	Surrogate Recoveries	Result		Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*60.5 %*		*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*55.0 %*		*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*40.6 %*		*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*29.3 %*	*S-BN*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*55.4 %*		*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*94.6 %*		*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0300	0.0300	1	EPA SW 846-8082A	05/22/2013 14:35	05/23/2013 14:09	JW

	Surrogate Recoveries	Result		Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*77.0 %*		*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*77.1 %*		*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**8380**		mg/kg dry	1.20	2.36	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.259	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-38-2	Arsenic	**3.09**		mg/kg dry	0.400	1.18	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-39-3	Barium	**64.9**		mg/kg dry	0.153	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.118	0.118	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.118	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-70-2	Calcium	**5190**		mg/kg dry	0.047	5.89	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW

Sample Information

Client Sample ID: MW-8 (7.5-9.5) **York Sample ID:** 13E0711-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Soil	May 20, 2013 2:10 pm	05/21/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**13.6**		mg/kg dry	0.141	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-48-4	Cobalt	**6.28**		mg/kg dry	0.094	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-50-8	Copper	**9.68**		mg/kg dry	0.141	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7439-89-6	Iron	**17300**		mg/kg dry	0.765	2.36	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7439-92-1	Lead	**7.88**		mg/kg dry	0.200	0.353	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7439-95-4	Magnesium	**3000**		mg/kg dry	0.530	5.89	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7439-96-5	Manganese	**115**		mg/kg dry	0.130	1.18	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-02-0	Nickel	**16.5**		mg/kg dry	0.153	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-09-7	Potassium	**768**	B	mg/kg dry	3.98	11.8	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7782-49-2	Selenium	**0.780**		mg/kg dry	0.589	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.118	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-23-5	Sodium	**205**	B	mg/kg dry	6.21	11.8	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.377	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-62-2	Vanadium	**18.3**		mg/kg dry	0.130	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW
7440-66-6	Zinc	**37.6**		mg/kg dry	0.106	0.589	1	EPA SW846-6010B	05/22/2013 14:56	05/22/2013 23:53	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0389	0.0389	1	EPA SW846-7471	05/22/2013 15:05	05/23/2013 09:05	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**84.9**		%	0.100	0.100	1	SM 2540G	05/22/2013 12:11	05/23/2013 09:58	AMC

Sample Information

Client Sample ID: TB-052113 **York Sample ID:** 13E0711-09

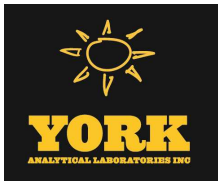
York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Water	May 21, 2013 12:00 am	05/21/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS



Sample Information

Client Sample ID: TB-052113 **York Sample ID:** 13E0711-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Water	May 21, 2013 12:00 am	05/21/2013

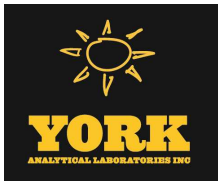
Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
76-13-1	1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS



Sample Information

Client Sample ID: TB-052113 **York Sample ID:** 13E0711-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Water	May 21, 2013 12:00 am	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-09-2	Methylene chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 11:55	05/23/2013 18:08	SS

Surrogate Recoveries	Result	Acceptance Range

Sample Information

Client Sample ID: TB-052113 **York Sample ID:** 13E0711-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0711	170246501	Water	May 21, 2013 12:00 am	05/21/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*105 %*			*72.6-129*						
460-00-4	*Surrogate: p-Bromofluorobenzene*	*104 %*			*63.5-145*						
2037-26-5	*Surrogate: Toluene-d8*	*102 %*			*81.2-127*						

Analytical Batch Summary

Batch ID: BE31025 **Preparation Method:** % Solids Prep **Prepared By:** AMC

YORK Sample ID	Client Sample ID	Preparation Date
13E0711-01	MW-7 (1-5)	05/22/13
13E0711-02	MW-7 (7-9)	05/22/13
13E0711-03	MW-9 (0-2)	05/22/13
13E0711-04	MW-9 (6-8)	05/22/13
13E0711-05	MW-6 (0-2)	05/22/13
13E0711-06	MW-6 (9-11)	05/22/13
13E0711-07	MW-8 (0.5-2.5)	05/22/13
13E0711-08	MW-8 (7.5-9.5)	05/22/13

Batch ID: BE31031 **Preparation Method:** EPA 3550B **Prepared By:** DB

YORK Sample ID	Client Sample ID	Preparation Date
13E0711-01	MW-7 (1-5)	05/22/13
13E0711-02	MW-7 (7-9)	05/22/13
13E0711-03	MW-9 (0-2)	05/22/13
13E0711-04	MW-9 (6-8)	05/22/13
13E0711-05	MW-6 (0-2)	05/22/13
13E0711-06	MW-6 (9-11)	05/22/13
13E0711-07	MW-8 (0.5-2.5)	05/22/13
13E0711-08	MW-8 (7.5-9.5)	05/22/13
BE31031-BLK1	Blank	05/22/13
BE31031-BS1	LCS	05/22/13
BE31031-BSD1	LCS Dup	05/22/13
BE31031-MS1	Matrix Spike	05/22/13

Batch ID: BE31033 **Preparation Method:** EPA 3550B **Prepared By:** DB

YORK Sample ID	Client Sample ID	Preparation Date
13E0711-01	MW-7 (1-5)	05/22/13
13E0711-02	MW-7 (7-9)	05/22/13
13E0711-03	MW-9 (0-2)	05/22/13
13E0711-04	MW-9 (6-8)	05/22/13
13E0711-05	MW-6 (0-2)	05/22/13
13E0711-06	MW-6 (9-11)	05/22/13
13E0711-07	MW-8 (0.5-2.5)	05/22/13
13E0711-08	MW-8 (7.5-9.5)	05/22/13
BE31033-BLK1	Blank	05/22/13
BE31033-BLK1	Blank	05/22/13
BE31033-BS1	LCS	05/22/13
BE31033-BS2	LCS	05/22/13
BE31033-BS2	LCS	05/22/13
BE31033-BSD1	LCS Dup	05/22/13
BE31033-BSD2	LCS Dup	05/22/13
BE31033-BSD2	LCS Dup	05/22/13
BE31033-MS1	Matrix Spike	05/22/13
BE31033-MS2	Matrix Spike	05/22/13

Batch ID: BE31035 **Preparation Method:** EPA 5035A **Prepared By:** EKM

YORK Sample ID	Client Sample ID	Preparation Date
13E0711-01	MW-7 (1-5)	05/22/13
13E0711-02	MW-7 (7-9)	05/22/13
13E0711-03	MW-9 (0-2)	05/22/13
13E0711-04	MW-9 (6-8)	05/22/13
13E0711-05	MW-6 (0-2)	05/22/13
13E0711-06	MW-6 (9-11)	05/22/13
13E0711-07	MW-8 (0.5-2.5)	05/22/13
13E0711-08	MW-8 (7.5-9.5)	05/22/13
BE31035-BLK1	Blank	05/22/13
BE31035-BS1	LCS	05/22/13
BE31035-BSD1	LCS Dup	05/22/13
BE31035-MS1	Matrix Spike	05/22/13

Batch ID: BE31041 **Preparation Method:** EPA 3050B **Prepared By:** MW

YORK Sample ID	Client Sample ID	Preparation Date
13E0711-01	MW-7 (1-5)	05/22/13
13E0711-02	MW-7 (7-9)	05/22/13
13E0711-03	MW-9 (0-2)	05/22/13
13E0711-04	MW-9 (6-8)	05/22/13
13E0711-05	MW-6 (0-2)	05/22/13
13E0711-06	MW-6 (9-11)	05/22/13
13E0711-07	MW-8 (0.5-2.5)	05/22/13
13E0711-08	MW-8 (7.5-9.5)	05/22/13
BE31041-BLK1	Blank	05/22/13
BE31041-DUP1	Duplicate	05/22/13
BE31041-MS1	Matrix Spike	05/22/13
BE31041-SRM1	Reference	05/22/13

Batch ID: BE31043 **Preparation Method:** EPA SW846-7471 **Prepared By:** AA

YORK Sample ID	Client Sample ID	Preparation Date
13E0711-01	MW-7 (1-5)	05/22/13
13E0711-02	MW-7 (7-9)	05/22/13
13E0711-03	MW-9 (0-2)	05/22/13
13E0711-04	MW-9 (6-8)	05/22/13
13E0711-05	MW-6 (0-2)	05/22/13
13E0711-06	MW-6 (9-11)	05/22/13
13E0711-07	MW-8 (0.5-2.5)	05/22/13
13E0711-08	MW-8 (7.5-9.5)	05/22/13
BE31043-BLK1	Blank	05/22/13
BE31043-BS1	LCS	05/22/13
BE31043-DUP1	Duplicate	05/22/13
BE31043-MS1	Matrix Spike	05/22/13

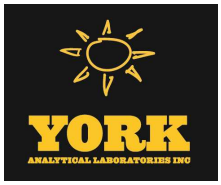
Batch ID: BE31080 **Preparation Method:** EPA 5030B **Prepared By:** KH

YORK Sample ID	Client Sample ID	Preparation Date
13E0711-09	TB-052113	05/23/13
BE31080-BLK1	Blank	05/23/13
BE31080-BS1	LCS	05/23/13
BE31080-BSD1	LCS Dup	05/23/13

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

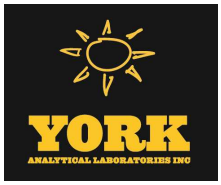
Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31035 - EPA 5035A											
Blank (BE31035-BLK1)											
Prepared: 05/22/2013 Analyzed: 05/23/2013											
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet								
1,1,1-Trichloroethane	ND	0.0050	"								
1,1,2,2-Tetrachloroethane	ND	0.0050	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.0050	"								
1,1,2-Trichloroethane	ND	0.0050	"								
1,1-Dichloroethane	ND	0.0050	"								
1,1-Dichloroethylene	ND	0.0050	"								
1,1-Dichloropropylene	ND	0.0050	"								
1,2,3-Trichlorobenzene	ND	0.0050	"								
1,2,3-Trichloropropane	ND	0.0050	"								
1,2,4-Trichlorobenzene	ND	0.0050	"								
1,2,4-Trimethylbenzene	ND	0.0050	"								
1,2-Dibromo-3-chloropropane	ND	0.0050	"								
1,2-Dibromoethane	ND	0.0050	"								
1,2-Dichlorobenzene	ND	0.0050	"								
1,2-Dichloroethane	ND	0.0050	"								
1,2-Dichloropropane	ND	0.0050	"								
1,3,5-Trimethylbenzene	ND	0.0050	"								
1,3-Dichlorobenzene	ND	0.0050	"								
1,3-Dichloropropane	ND	0.0050	"								
1,4-Dichlorobenzene	ND	0.0050	"								
1,4-Dioxane	ND	0.10	"								
2,2-Dichloropropane	ND	0.0050	"								
2-Butanone	ND	0.0050	"								
2-Chlorotoluene	ND	0.0050	"								
4-Chlorotoluene	ND	0.0050	"								
Acetone	ND	0.010	"								
Benzene	ND	0.0050	"								
Bromobenzene	ND	0.0050	"								
Bromochloromethane	ND	0.0050	"								
Bromodichloromethane	ND	0.0050	"								
Bromoform	ND	0.0050	"								
Bromomethane	ND	0.0050	"								
Carbon tetrachloride	ND	0.0050	"								
Chlorobenzene	ND	0.0050	"								
Chloroethane	ND	0.0050	"								
Chloroform	ND	0.0050	"								
Chloromethane	ND	0.0050	"								
cis-1,2-Dichloroethylene	ND	0.0050	"								
cis-1,3-Dichloropropylene	ND	0.0050	"								
Dibromochloromethane	ND	0.0050	"								
Dibromomethane	ND	0.0050	"								
Dichlorodifluoromethane	ND	0.0050	"								
Ethyl Benzene	ND	0.0050	"								
Hexachlorobutadiene	ND	0.0050	"								
Isopropylbenzene	ND	0.0050	"								
Methyl tert-butyl ether (MTBE)	ND	0.0050	"								
Methylene chloride	ND	0.010	"								
Naphthalene	0.0025	0.010	"								
n-Butylbenzene	ND	0.0050	"								
n-Propylbenzene	ND	0.0050	"								



Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

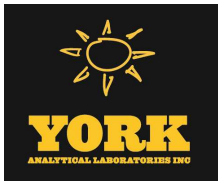
Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31035 - EPA 5035A											
Blank (BE31035-BLK1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
o-Xylene	ND	0.0050	mg/kg wet								
p- & m- Xylenes	ND	0.010	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
Styrene	ND	0.0050	"								
tert-Butylbenzene	ND	0.0050	"								
Tetrachloroethylene	ND	0.0050	"								
Toluene	ND	0.0050	"								
trans-1,2-Dichloroethylene	ND	0.0050	"								
trans-1,3-Dichloropropylene	ND	0.0050	"								
Trichloroethylene	ND	0.0050	"								
Trichlorofluoromethane	ND	0.0050	"								
Vinyl Chloride	ND	0.0050	"								
Xylenes, Total	ND	0.015	"								
Vinyl acetate	ND	0.0050	"								
Surrogate: 1,2-Dichloroethane-d4	*57.3*		*ug/L*	*50.0*		*115*	*73-130*				
Surrogate: p-Bromofluorobenzene	*48.9*		*"*	*50.0*		*97.7*	*72-127*				
Surrogate: Toluene-d8	*51.6*		*"*	*50.0*		*103*	*84-117*				
LCS (BE31035-BS1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
1,1,1,2-Tetrachloroethane	52		ug/L	50.0		105	72-132				
1,1,1-Trichloroethane	41		"	50.0		81.4	77-131				
1,1,2,2-Tetrachloroethane	52		"	50.0		105	68-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	37		"	50.0		74.7	75-143	Low Bias			
1,1,2-Trichloroethane	52		"	50.0		105	72-128				
1,1-Dichloroethane	40		"	50.0		79.7	78-133				
1,1-Dichloroethylene	38		"	50.0		76.5	71-142				
1,1-Dichloropropylene	41		"	50.0		81.4	77-124				
1,2,3-Trichlorobenzene	50		"	50.0		99.6	65-134				
1,2,3-Trichloropropane	51		"	50.0		103	65-127				
1,2,4-Trichlorobenzene	47		"	50.0		93.7	59-133				
1,2,4-Trimethylbenzene	47		"	50.0		94.6	68-128				
1,2-Dibromo-3-chloropropane	68		"	50.0		137	58-145				
1,2-Dibromoethane	54		"	50.0		107	73-128				
1,2-Dichlorobenzene	49		"	50.0		98.4	69-126				
1,2-Dichloroethane	53		"	50.0		106	78-131				
1,2-Dichloropropane	57		"	50.0		114	72-129				
1,3,5-Trimethylbenzene	49		"	50.0		97.3	67-125				
1,3-Dichlorobenzene	48		"	50.0		95.4	67-125				
1,3-Dichloropropane	53		"	50.0		106	73-126				
1,4-Dichlorobenzene	48		"	50.0		96.4	67-127				
1,4-Dioxane	56		"	50.0		112	10-265				
2,2-Dichloropropane	36		"	50.0		72.5	68-133				
2-Butanone	47		"	50.0		93.5	49-138				
2-Chlorotoluene	47		"	50.0		93.6	61-121				
4-Chlorotoluene	49		"	50.0		97.2	65-126				
Acetone	31		"	50.0		61.1	21-131				
Benzene	45		"	50.0		90.3	81-125				
Bromobenzene	51		"	50.0		102	65-125				
Bromochloromethane	43		"	50.0		86.5	78-127				
Bromodichloromethane	57		"	50.0		114	73-131				
Bromoform	56		"	50.0		113	66-137				



Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31035 - EPA 5035A											
LCS (BE31035-BS1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
Bromomethane	36		ug/L	50.0		72.8	55-144				
Carbon tetrachloride	48		"	50.0		96.3	74-137				
Chlorobenzene	49		"	50.0		98.2	75-127				
Chloroethane	37		"	50.0		73.8	65-138				
Chloroform	41		"	50.0		82.3	82-128				
Chloromethane	20		"	50.0		39.7	51-138	Low Bias			
cis-1,2-Dichloroethylene	41		"	50.0		81.4	77-130				
cis-1,3-Dichloropropylene	53		"	50.0		106	68-123				
Dibromochloromethane	56		"	50.0		113	73-136				
Dibromomethane	60		"	50.0		120	75-131				
Dichlorodifluoromethane	15		"	50.0		30.3	10-183				
Ethyl Benzene	52		"	50.0		103	75-130				
Hexachlorobutadiene	48		"	50.0		95.5	59-130				
Isopropylbenzene	48		"	50.0		96.3	68-135				
Methyl tert-butyl ether (MTBE)	43		"	50.0		86.4	76-136				
Methylene chloride	39		"	50.0		77.3	55-143				
Naphthalene	54		"	50.0		109	65-140				
n-Butylbenzene	46		"	50.0		92.6	63-123				
n-Propylbenzene	48		"	50.0		95.3	65-127				
o-Xylene	49		"	50.0		97.8	71-123				
p- & m- Xylenes	100		"	100		100	72-127				
p-Isopropyltoluene	48		"	50.0		95.3	69-128				
sec-Butylbenzene	49		"	50.0		98.2	69-125				
Styrene	51		"	50.0		102	74-127				
tert-Butylbenzene	46		"	50.0		91.3	59-164				
Tetrachloroethylene	69		"	50.0		137	65-151				
Toluene	50		"	50.0		99.7	72-127				
trans-1,2-Dichloroethylene	40		"	50.0		79.2	73-137				
trans-1,3-Dichloropropylene	51		"	50.0		101	67-131				
Trichloroethylene	58		"	50.0		117	73-129				
Trichlorofluoromethane	35		"	50.0		69.2	69-136				
Vinyl Chloride	28		"	50.0		56.4	58-132	Low Bias			
Vinyl acetate	29		"	50.0		57.8	10-84				
Surrogate: 1,2-Dichloroethane-d4	*51.9*		*"*	*50.0*		*104*	*73-130*				
Surrogate: p-Bromofluorobenzene	*49.8*		*"*	*50.0*		*99.6*	*72-127*				
Surrogate: Toluene-d8	*51.6*		*"*	*50.0*		*103*	*84-117*				



Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31035 - EPA 5035A											
LCS Dup (BE31035-BSD1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
1,1,1,2-Tetrachloroethane	53		ug/L	50.0		107	72-132		1.74	30	
1,1,1-Trichloroethane	43		"	50.0		85.1	77-131		4.35	30	
1,1,2,2-Tetrachloroethane	52		"	50.0		105	68-129		0.363	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	41		"	50.0		81.1	75-143		8.19	30	
1,1,2-Trichloroethane	51		"	50.0		103	72-128		1.80	30	
1,1-Dichloroethane	43		"	50.0		86.3	78-133		7.93	30	
1,1-Dichloroethylene	39		"	50.0		79.0	71-142		3.16	30	
1,1-Dichloropropylene	40		"	50.0		79.3	77-124		2.61	30	
1,2,3-Trichlorobenzene	51		"	50.0		102	65-134		2.42	30	
1,2,3-Trichloropropane	53		"	50.0		106	65-127		2.80	30	
1,2,4-Trichlorobenzene	48		"	50.0		96.6	59-133		3.09	30	
1,2,4-Trimethylbenzene	47		"	50.0		94.3	68-128		0.381	30	
1,2-Dibromo-3-chloropropane	69		"	50.0		137	58-145		0.496	30	
1,2-Dibromoethane	54		"	50.0		108	73-128		0.130	30	
1,2-Dichlorobenzene	50		"	50.0		101	69-126		2.21	30	
1,2-Dichloroethane	48		"	50.0		96.2	78-131		9.60	30	
1,2-Dichloropropane	55		"	50.0		110	72-129		3.69	30	
1,3,5-Trimethylbenzene	48		"	50.0		95.8	67-125		1.55	30	
1,3-Dichlorobenzene	48		"	50.0		95.3	67-125		0.168	30	
1,3-Dichloropropane	53		"	50.0		106	73-126		0.264	30	
1,4-Dichlorobenzene	48		"	50.0		95.6	67-127		0.854	30	
1,4-Dioxane	41		"	50.0		82.8	10-265		29.6	30	
2,2-Dichloropropane	37		"	50.0		74.5	68-133		2.72	30	
2-Butanone	49		"	50.0		98.1	49-138		4.82	30	
2-Chlorotoluene	46		"	50.0		92.2	61-121		1.59	30	
4-Chlorotoluene	48		"	50.0		96.4	65-126		0.868	30	
Acetone	30		"	50.0		60.8	21-131		0.492	30	
Benzene	41		"	50.0		82.7	81-125		8.83	30	
Bromobenzene	50		"	50.0		99.4	65-125		2.09	30	
Bromochloromethane	43		"	50.0		85.6	78-127		1.07	30	
Bromodichloromethane	56		"	50.0		113	73-131		1.07	30	
Bromoform	55		"	50.0		109	66-137		3.10	30	
Bromomethane	41		"	50.0		82.8	55-144		12.8	30	
Carbon tetrachloride	44		"	50.0		87.6	74-137		9.46	30	
Chlorobenzene	50		"	50.0		99.6	75-127		1.46	30	
Chloroethane	37		"	50.0		73.0	65-138		1.06	30	
Chloroform	43		"	50.0		85.3	82-128		3.63	30	
Chloromethane	20		"	50.0		39.9	51-138	Low Bias	0.553	30	
cis-1,2-Dichloroethylene	42		"	50.0		85.0	77-130		4.28	30	
cis-1,3-Dichloropropylene	54		"	50.0		108	68-123		2.19	30	
Dibromochloromethane	58		"	50.0		115	73-136		2.09	30	
Dibromomethane	59		"	50.0		118	75-131		1.83	30	
Dichlorodifluoromethane	15		"	50.0		30.0	10-183		0.796	30	
Ethyl Benzene	52		"	50.0		104	75-130		0.658	30	
Hexachlorobutadiene	49		"	50.0		98.7	59-130		3.32	30	
Isopropylbenzene	47		"	50.0		94.0	68-135		2.33	30	
Methyl tert-butyl ether (MTBE)	46		"	50.0		91.2	76-136		5.45	30	
Methylene chloride	41		"	50.0		81.4	55-143		5.14	30	
Naphthalene	55		"	50.0		109	65-140		0.422	30	
n-Butylbenzene	46		"	50.0		92.3	63-123		0.389	30	
n-Propylbenzene	47		"	50.0		94.7	65-127		0.589	30	

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31035 - EPA 5035A											
LCS Dup (BE31035-BSD1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
o-Xylene	50		ug/L	50.0		100	71-123		2.62	30	
p- & m- Xylenes	100		"	100		103	72-127		2.54	30	
p-Isopropyltoluene	47		"	50.0		94.6	69-128		0.779	30	
sec-Butylbenzene	49		"	50.0		97.3	69-125		0.900	30	
Styrene	52		"	50.0		104	74-127		1.96	30	
tert-Butylbenzene	47		"	50.0		93.8	59-164		2.66	30	
Tetrachloroethylene	58		"	50.0		116	65-151		16.6	30	
Toluene	51		"	50.0		102	72-127		1.85	30	
trans-1,2-Dichloroethylene	40		"	50.0		80.7	73-137		1.88	30	
trans-1,3-Dichloropropylene	51		"	50.0		103	67-131		1.41	30	
Trichloroethylene	56		"	50.0		112	73-129		4.20	30	
Trichlorofluoromethane	36		"	50.0		71.7	69-136		3.63	30	
Vinyl Chloride	30		"	50.0		59.1	58-132		4.68	30	
Vinyl acetate	34		"	50.0		67.5	10-84		15.4	30	
Surrogate: 1,2-Dichloroethane-d4	*45.9*		*"*	*50.0*		*91.8*	*73-130*				
Surrogate: p-Bromofluorobenzene	*48.3*		*"*	*50.0*		*96.6*	*72-127*				
Surrogate: Toluene-d8	*50.5*		*"*	*50.0*		*101*	*84-117*				
Matrix Spike (BE31035-MS1)	*Source sample: 13E0711-01 (MW-7 (1-5))							Prepared: 05/22/2013 Analyzed: 05/23/2013			
1,1,1,2-Tetrachloroethane	49		ug/L	50.0	ND	97.2	48-129				
1,1,1-Trichloroethane	57		"	50.0	ND	115	60-128				
1,1,2,2-Tetrachloroethane	23		"	50.0	ND	46.8	20-143				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	50		"	50.0	ND	101	52-129				
1,1,2-Trichloroethane	48		"	50.0	ND	95.9	53-126				
1,1-Dichloroethane	57		"	50.0	ND	114	62-129				
1,1-Dichloroethylene	51		"	50.0	ND	103	50-138				
1,1-Dichloropropylene	43		"	50.0	ND	86.8	49-120				
1,2,3-Trichlorobenzene	18		"	50.0	ND	36.3	10-120				
1,2,3-Trichloropropane	47		"	50.0	ND	93.7	42-132				
1,2,4-Trichlorobenzene	17		"	50.0	ND	34.7	10-113				
1,2,4-Trimethylbenzene	37		"	50.0	ND	73.4	10-173				
1,2-Dibromo-3-chloropropane	51		"	50.0	ND	103	16-151				
1,2-Dibromoethane	42		"	50.0	ND	83.6	37-134				
1,2-Dichlorobenzene	30		"	50.0	ND	60.6	12-121				
1,2-Dichloroethane	55		"	50.0	ND	110	53-133				
1,2-Dichloropropane	52		"	50.0	ND	105	58-126				
1,3,5-Trimethylbenzene	42		"	50.0	ND	83.0	10-155				
1,3-Dichlorobenzene	26		"	50.0	ND	52.7	12-116				
1,3-Dichloropropane	47		"	50.0	ND	94.2	50-127				
1,4-Dichlorobenzene	24		"	50.0	ND	48.3	9-118				
1,4-Dioxane	32		"	50.0	ND	63.7	10-249				
2,2-Dichloropropane	30		"	50.0	ND	60.9	47-119				
2-Butanone	46		"	50.0	ND	91.6	13-140				
2-Chlorotoluene	36		"	50.0	ND	71.7	24-115				
4-Chlorotoluene	33		"	50.0	ND	66.7	22-115				
Acetone	47		"	50.0	ND	93.8	10-130				
Benzene	46		"	50.0	ND	91.9	52-127				
Bromobenzene	35		"	50.0	ND	70.1	27-119				
Bromochloromethane	51		"	50.0	ND	103	52-129				
Bromodichloromethane	55		"	50.0	ND	111	50-132				
Bromoform	46		"	50.0	ND	91.4	31-138				
Bromomethane	47		"	50.0	18	58.5	20-141				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31035 - EPA 5035A											
Matrix Spike (BE31035-MS1)	*Source sample: 13E0711-01 (MW-7 (1-5))							Prepared: 05/22/2013 Analyzed: 05/23/2013			
Carbon tetrachloride	55		ug/L	50.0	ND	111	52-131				
Chlorobenzene	37		"	50.0	ND	74.4	36-125				
Chloroethane	44		"	50.0	ND	87.6	35-143				
Chloroform	58		"	50.0	ND	117	62-127				
Chloromethane	24		"	50.0	1.9	44.6	36-128				
cis-1,2-Dichloroethylene	49		"	50.0	ND	98.6	51-128				
cis-1,3-Dichloropropylene	38		"	50.0	ND	75.5	27-126				
Dibromochloromethane	49		"	50.0	ND	98.2	42-137				
Dibromomethane	58		"	50.0	ND	117	47-136				
Dichlorodifluoromethane	15		"	50.0	ND	30.3	10-143				
Ethyl Benzene	44		"	50.0	ND	87.6	32-131				
Hexachlorobutadiene	31		"	50.0	ND	62.7	10-109				
Isopropylbenzene	42		"	50.0	ND	84.4	21-143				
Methyl tert-butyl ether (MTBE)	51		"	50.0	ND	101	55-144				
Methylene chloride	52		"	50.0	20	63.2	17-147				
Naphthalene	17		"	50.0	1.6	31.2	10-142				
n-Butylbenzene	31		"	50.0	ND	61.3	10-116				
n-Propylbenzene	37		"	50.0	ND	73.5	70-130				
o-Xylene	42		"	50.0	ND	83.9	70-130				
p- & m- Xylenes	85		"	100	ND	84.5	70-130				
p-Isopropyltoluene	37		"	50.0	ND	73.8	70-130				
sec-Butylbenzene	40		"	50.0	ND	80.0	12-129				
Styrene	33		"	50.0	ND	66.1	13-130				
tert-Butylbenzene	38		"	50.0	ND	76.4	20-149				
Tetrachloroethylene	75		"	50.0	ND	151	26-179				
Toluene	45		"	50.0	ND	90.3	30-138				
trans-1,2-Dichloroethylene	46		"	50.0	ND	92.5	46-132				
trans-1,3-Dichloropropylene	32		"	50.0	ND	63.3	20-132				
Trichloroethylene	66		"	50.0	ND	131	31-152				
Trichlorofluoromethane	48		"	50.0	ND	95.9	50-129				
Vinyl Chloride	34		"	50.0	ND	68.0	41-124				
Vinyl acetate	1.1		"	50.0	ND	2.20	10-62	Low Bias			
Surrogate: 1,2-Dichloroethane-d4	*63.0*		*"*	*50.0*		*126*	*73-130*				
Surrogate: p-Bromofluorobenzene	*49.3*		*"*	*50.0*		*98.5*	*72-127*				
Surrogate: Toluene-d8	*51.3*		*"*	*50.0*		*103*	*84-117*				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31080 - EPA 5030B											
Blank (BE31080-BLK1)											Prepared & Analyzed: 05/23/2013
1,1,1,2-Tetrachloroethane	ND	5.0	ug/L								
1,1,1-Trichloroethane	ND	5.0	"								
1,1,2,2-Tetrachloroethane	ND	5.0	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"								
1,1,2-Trichloroethane	ND	5.0	"								
1,1-Dichloroethane	ND	5.0	"								
1,1-Dichloroethylene	ND	5.0	"								
1,1-Dichloropropylene	ND	5.0	"								
1,2,3-Trichlorobenzene	ND	5.0	"								
1,2,3-Trichloropropane	ND	5.0	"								
1,2,4-Trichlorobenzene	ND	5.0	"								
1,2,4-Trimethylbenzene	ND	5.0	"								
1,2-Dibromo-3-chloropropane	ND	5.0	"								
1,2-Dibromoethane	ND	5.0	"								
1,2-Dichlorobenzene	ND	5.0	"								
1,2-Dichloroethane	ND	5.0	"								
1,2-Dichloropropane	ND	5.0	"								
1,3,5-Trimethylbenzene	ND	5.0	"								
1,3-Dichlorobenzene	ND	5.0	"								
1,3-Dichloropropane	ND	5.0	"								
1,4-Dichlorobenzene	ND	5.0	"								
2,2-Dichloropropane	ND	5.0	"								
2-Butanone	ND	5.0	"								
2-Chlorotoluene	ND	5.0	"								
4-Chlorotoluene	ND	5.0	"								
Acetone	2.6	5.0	"								
Benzene	ND	5.0	"								
Bromobenzene	ND	5.0	"								
Bromochloromethane	ND	5.0	"								
Bromodichloromethane	ND	5.0	"								
Bromoform	ND	5.0	"								
Bromomethane	ND	5.0	"								
Carbon tetrachloride	ND	5.0	"								
Chlorobenzene	ND	5.0	"								
Chloroethane	ND	5.0	"								
Chloroform	ND	5.0	"								
Chloromethane	ND	5.0	"								
cis-1,2-Dichloroethylene	ND	5.0	"								
cis-1,3-Dichloropropylene	ND	5.0	"								
Dibromochloromethane	ND	5.0	"								
Dibromomethane	ND	5.0	"								
Dichlorodifluoromethane	ND	5.0	"								
Ethyl Benzene	ND	5.0	"								
Hexachlorobutadiene	ND	5.0	"								
Isopropylbenzene	ND	5.0	"								
Methyl tert-butyl ether (MTBE)	ND	5.0	"								
Methylene chloride	ND	5.0	"								
Naphthalene	ND	5.0	"								
n-Butylbenzene	ND	5.0	"								
n-Propylbenzene	ND	5.0	"								
o-Xylene	ND	5.0	"								

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31080 - EPA 5030B											
Blank (BE31080-BLK1)									Prepared & Analyzed: 05/23/2013		
p- & m- Xylenes	ND	10	ug/L								
p-Isopropyltoluene	ND	5.0	"								
sec-Butylbenzene	ND	5.0	"								
Styrene	ND	5.0	"								
tert-Butylbenzene	ND	5.0	"								
Tetrachloroethylene	ND	5.0	"								
Toluene	ND	5.0	"								
trans-1,2-Dichloroethylene	ND	5.0	"								
trans-1,3-Dichloropropylene	ND	5.0	"								
Trichloroethylene	ND	5.0	"								
Trichlorofluoromethane	ND	5.0	"								
Vinyl Chloride	ND	5.0	"								
Xylenes, Total	ND	15	"								
Vinyl acetate	ND	5.0	"								
Surrogate: 1,2-Dichloroethane-d4	*55.6*		*"*	*50.0*		*111*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*50.0*		*"*	*50.0*		*100*	*63.5-145*				
Surrogate: Toluene-d8	*51.8*		*"*	*50.0*		*104*	*81.2-127*				
LCS (BE31080-BS1)									Prepared & Analyzed: 05/23/2013		
1,1,1,2-Tetrachloroethane	54		ug/L	50.0		108	82.3-130				
1,1,1-Trichloroethane	58		"	50.0		116	75.6-137				
1,1,2,2-Tetrachloroethane	52		"	50.0		104	71.3-131				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	54		"	50.0		108	71.1-129				
1,1,2-Trichloroethane	51		"	50.0		102	74.5-129				
1,1-Dichloroethane	52		"	50.0		104	79.6-132				
1,1-Dichloroethylene	53		"	50.0		107	80.2-146				
1,1-Dichloropropylene	51		"	50.0		102	75-136				
1,2,3-Trichlorobenzene	53		"	50.0		105	66.1-136				
1,2,3-Trichloropropane	52		"	50.0		104	63-131				
1,2,4-Trichlorobenzene	54		"	50.0		108	70.6-136				
1,2,4-Trimethylbenzene	50		"	50.0		101	75.3-135				
1,2-Dibromo-3-chloropropane	68		"	50.0		136	58.9-140				
1,2-Dibromoethane	53		"	50.0		106	79-130				
1,2-Dichlorobenzene	50		"	50.0		100	76.1-122				
1,2-Dichloroethane	57		"	50.0		113	74.6-132				
1,2-Dichloropropane	53		"	50.0		106	76.9-129				
1,3,5-Trimethylbenzene	53		"	50.0		105	70.6-127				
1,3-Dichlorobenzene	50		"	50.0		99.5	77-124				
1,3-Dichloropropane	52		"	50.0		105	75.8-126				
1,4-Dichlorobenzene	51		"	50.0		102	76.6-125				
2,2-Dichloropropane	57		"	50.0		114	69-133				
2-Butanone	45		"	50.0		89.2	70-130				
2-Chlorotoluene	50		"	50.0		101	66.3-119				
4-Chlorotoluene	53		"	50.0		106	69.2-127				
Acetone	38		"	50.0		76.7	70-130				
Benzene	49		"	50.0		98.8	76.2-129				
Bromobenzene	52		"	50.0		104	71.3-123				
Bromochloromethane	52		"	50.0		104	70.8-137				
Bromodichloromethane	59		"	50.0		118	79.7-134				
Bromoform	55		"	50.0		111	70.5-141				
Bromomethane	48		"	50.0		96.6	43.9-147				
Carbon tetrachloride	58		"	50.0		117	78.1-138				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31080 - EPA 5030B											
LCS (BE31080-BS1)							Prepared & Analyzed: 05/23/2013				
Chlorobenzene	52		ug/L	50.0		103	80.4-125				
Chloroethane	47		"	50.0		93.6	55.8-140				
Chloroform	55		"	50.0		109	76.6-133				
Chloromethane	29		"	50.0		58.0	48.8-115				
cis-1,2-Dichloroethylene	53		"	50.0		106	75.1-128				
cis-1,3-Dichloropropylene	56		"	50.0		111	74.5-128				
Dibromochloromethane	58		"	50.0		115	79.8-134				
Dibromomethane	56		"	50.0		113	79-130				
Dichlorodifluoromethane	38		"	50.0		77.0	47.1-101				
Ethyl Benzene	55		"	50.0		110	80.8-128				
Hexachlorobutadiene	55		"	50.0		111	64.8-128				
Isopropylbenzene	51		"	50.0		102	75.5-135				
Methyl tert-butyl ether (MTBE)	51		"	50.0		102	65.1-140				
Methylene chloride	49		"	50.0		99.0	61.3-120				
Naphthalene	50		"	50.0		99.6	62.3-148				
n-Butylbenzene	51		"	50.0		102	67.2-123				
n-Propylbenzene	51		"	50.0		101	70.5-127				
o-Xylene	53		"	50.0		106	75.9-122				
p- & m- Xylenes	110		"	100		110	77.7-127				
p-Isopropyltoluene	52		"	50.0		103	75.6-129				
sec-Butylbenzene	52		"	50.0		105	71.5-125				
Styrene	53		"	50.0		106	77.8-123				
tert-Butylbenzene	51		"	50.0		103	75.9-151				
Tetrachloroethylene	52		"	50.0		104	63.6-167				
Toluene	53		"	50.0		106	77-123				
trans-1,2-Dichloroethylene	52		"	50.0		104	76.3-139				
trans-1,3-Dichloropropylene	55		"	50.0		109	72.5-137				
Trichloroethylene	57		"	50.0		114	77.9-130				
Trichlorofluoromethane	54		"	50.0		109	57.4-133				
Vinyl Chloride	42		"	50.0		84.4	54.9-124				
Vinyl acetate	37		"	50.0		74.8	70-130				
Surrogate: 1,2-Dichloroethane-d4	*57.0*		*"*	*50.0*		*114*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*51.6*		*"*	*50.0*		*103*	*63.5-145*				
Surrogate: Toluene-d8	*51.1*		*"*	*50.0*		*102*	*81.2-127*				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31080 - EPA 5030B											
LCS Dup (BE31080-BSD1)								Prepared & Analyzed: 05/23/2013			
1,1,1,2-Tetrachloroethane	60		ug/L	50.0		119	82.3-130		9.67	21.1	
1,1,1-Trichloroethane	61		"	50.0		122	75.6-137		4.87	19.7	
1,1,2,2-Tetrachloroethane	54		"	50.0		107	71.3-131		2.44	20.8	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	55		"	50.0		109	71.1-129		1.18	21.7	
1,1,2-Trichloroethane	55		"	50.0		111	74.5-129		8.03	20.3	
1,1-Dichloroethane	54		"	50.0		108	79.6-132		3.41	20.6	
1,1-Dichloroethylene	55		"	50.0		109	80.2-146		2.27	20	
1,1-Dichloropropylene	51		"	50.0		102	75-136		0.352	19.3	
1,2,3-Trichlorobenzene	56		"	50.0		113	66.1-136		6.85	21.6	
1,2,3-Trichloropropane	54		"	50.0		107	63-131		2.89	23.9	
1,2,4-Trichlorobenzene	57		"	50.0		113	70.6-136		4.80	21.7	
1,2,4-Trimethylbenzene	55		"	50.0		111	75.3-135		9.12	18.8	
1,2-Dibromo-3-chloropropane	68		"	50.0		136	58.9-140		0.441	27.7	
1,2-Dibromoethane	56		"	50.0		112	79-130		6.05	23	
1,2-Dichlorobenzene	56		"	50.0		112	76.1-122		11.0	19.8	
1,2-Dichloroethane	57		"	50.0		114	74.6-132		1.00	20.2	
1,2-Dichloropropane	52		"	50.0		104	76.9-129		2.09	20.7	
1,3,5-Trimethylbenzene	56		"	50.0		113	70.6-127		6.62	18.9	
1,3-Dichlorobenzene	54		"	50.0		108	77-124		8.18	19.2	
1,3-Dichloropropane	56		"	50.0		111	75.8-126		6.17	22.1	
1,4-Dichlorobenzene	54		"	50.0		108	76.6-125		5.83	18.6	
2,2-Dichloropropane	58		"	50.0		115	69-133		1.15	19.8	
2-Butanone	49		"	50.0		98.9	70-130		10.4	30	
2-Chlorotoluene	55		"	50.0		110	66.3-119		8.51	21.6	
4-Chlorotoluene	57		"	50.0		114	69.2-127		7.00	19	
Acetone	30		"	50.0		60.0	70-130	Low Bias	24.4	30	
Benzene	51		"	50.0		101	76.2-129		2.38	19	
Bromobenzene	56		"	50.0		112	71.3-123		7.39	20.3	
Bromochloromethane	54		"	50.0		108	70.8-137		3.91	23.9	
Bromodichloromethane	62		"	50.0		123	79.7-134		4.18	21	
Bromoform	58		"	50.0		116	70.5-141		4.47	21.8	
Bromomethane	55		"	50.0		110	43.9-147		12.8	28.4	
Carbon tetrachloride	61		"	50.0		123	78.1-138		4.64	20.1	
Chlorobenzene	55		"	50.0		111	80.4-125		7.23	19.9	
Chloroethane	48		"	50.0		96.5	55.8-140		3.09	23.3	
Chloroform	57		"	50.0		115	76.6-133		4.98	20.3	
Chloromethane	29		"	50.0		57.9	48.8-115		0.173	24.5	
cis-1,2-Dichloroethylene	53		"	50.0		106	75.1-128		0.510	20.5	
cis-1,3-Dichloropropylene	58		"	50.0		116	74.5-128		4.65	19.9	
Dibromochloromethane	61		"	50.0		121	79.8-134		4.82	21.3	
Dibromomethane	59		"	50.0		118	79-130		4.71	22.4	
Dichlorodifluoromethane	39		"	50.0		77.6	47.1-101		0.802	23.9	
Ethyl Benzene	59		"	50.0		118	80.8-128		7.11	19.2	
Hexachlorobutadiene	61		"	50.0		121	64.8-128		9.01	20.6	
Isopropylbenzene	55		"	50.0		109	75.5-135		6.81	20	
Methyl tert-butyl ether (MTBE)	49		"	50.0		98.8	65.1-140		3.36	23.6	
Methylene chloride	48		"	50.0		95.6	61.3-120		3.43	20.4	
Naphthalene	52		"	50.0		103	62.3-148		3.45	27.1	
n-Butylbenzene	56		"	50.0		112	67.2-123		9.08	19.1	
n-Propylbenzene	55		"	50.0		110	70.5-127		8.05	23.4	
o-Xylene	58		"	50.0		115	75.9-122		8.52	19.3	

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

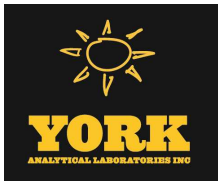
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31080 - EPA 5030B											
LCS Dup (BE31080-BSD1)								Prepared & Analyzed: 05/23/2013			
p- & m- Xylenes	120		ug/L	100		118	77.7-127		7.51	18.6	
p-Isopropyltoluene	57		"	50.0		113	75.6-129		9.53	19.1	
sec-Butylbenzene	57		"	50.0		113	71.5-125		7.76	18.9	
Styrene	58		"	50.0		116	77.8-123		8.87	20.9	
tert-Butylbenzene	57		"	50.0		114	75.9-151		10.4	20.9	
Tetrachloroethylene	55		"	50.0		110	63.6-167		5.52	27.7	
Toluene	55		"	50.0		111	77-123		4.17	18.7	
trans-1,2-Dichloroethylene	52		"	50.0		104	76.3-139		0.0577	19.5	
trans-1,3-Dichloropropylene	57		"	50.0		114	72.5-137		4.29	19.3	
Trichloroethylene	55		"	50.0		110	77.9-130		4.09	20.5	
Trichlorofluoromethane	56		"	50.0		113	57.4-133		3.58	21.4	
Vinyl Chloride	40		"	50.0		80.7	54.9-124		4.46	22.3	
Vinyl acetate	38		"	50.0		75.1	70-130		0.400	30	
Surrogate: 1,2-Dichloroethane-d4	*53.3*		*"*	*50.0*		*107*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*50.3*		*"*	*50.0*		*101*	*63.5-145*				
Surrogate: Toluene-d8	*51.8*		*"*	*50.0*		*104*	*81.2-127*				

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

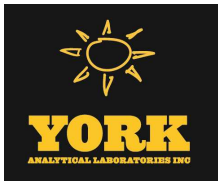
Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31031 - EPA 3550B											
Blank (BE31031-BLK1)											
Prepared: 05/22/2013 Analyzed: 05/23/2013											
Acenaphthene	ND	0.250	mg/kg wet								
Acenaphthylene	ND	0.250	"								
Aniline	ND	0.250	"								
Anthracene	ND	0.250	"								
Benzo(a)anthracene	ND	0.250	"								
Benzo(a)pyrene	ND	0.250	"								
Benzo(b)fluoranthene	ND	0.250	"								
Benzo(g,h,i)perylene	ND	0.250	"								
Benzyl alcohol	ND	0.250	"								
Benzo(k)fluoranthene	ND	0.250	"								
Benzyl butyl phthalate	ND	0.250	"								
4-Bromophenyl phenyl ether	ND	0.250	"								
4-Chloro-3-methylphenol	ND	0.250	"								
4-Chloroaniline	ND	0.250	"								
Bis(2-chloroethoxy)methane	ND	0.250	"								
Bis(2-chloroethyl)ether	ND	0.250	"								
Bis(2-chloroisopropyl)ether	ND	0.250	"								
Bis(2-ethylhexyl)phthalate	ND	0.250	"								
2-Chloronaphthalene	ND	0.250	"								
2-Chlorophenol	ND	0.250	"								
4-Chlorophenyl phenyl ether	ND	0.250	"								
Chrysene	ND	0.250	"								
Dibenzo(a,h)anthracene	ND	0.250	"								
Dibenzofuran	ND	0.250	"								
Di-n-butyl phthalate	ND	0.250	"								
1,2-Dichlorobenzene	ND	0.250	"								
1,4-Dichlorobenzene	ND	0.250	"								
1,3-Dichlorobenzene	ND	0.250	"								
3,3'-Dichlorobenzidine	ND	0.250	"								
2,4-Dichlorophenol	ND	0.250	"								
Diethyl phthalate	ND	0.250	"								
2,4-Dimethylphenol	ND	0.250	"								
Dimethyl phthalate	ND	0.250	"								
2-Nitroaniline	ND	0.250	"								
4,6-Dinitro-2-methylphenol	ND	0.500	"								
2,4-Dinitrophenol	ND	0.500	"								
2,6-Dinitrotoluene	ND	0.250	"								
2,4-Dinitrotoluene	ND	0.250	"								
Di-n-octyl phthalate	ND	0.250	"								
Fluoranthene	ND	0.250	"								
Fluorene	ND	0.250	"								
Hexachlorobenzene	ND	0.250	"								
Hexachlorobutadiene	ND	0.250	"								
Hexachlorocyclopentadiene	ND	0.250	"								
Hexachloroethane	ND	0.250	"								
Indeno(1,2,3-cd)pyrene	ND	0.250	"								
Isophorone	ND	0.250	"								
2-Methylnaphthalene	ND	0.250	"								
2-Methylphenol	ND	0.250	"								
3- & 4-Methylphenols	ND	0.250	"								
Naphthalene	ND	0.250	"								



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

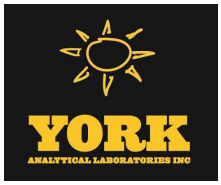
Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31031 - EPA 3550B											
Blank (BE31031-BLK1)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
3-Nitroaniline	ND	0.250	mg/kg wet								
4-Nitroaniline	ND	0.250	"								
Nitrobenzene	ND	0.250	"								
4-Nitrophenol	ND	0.250	"								
2-Nitrophenol	ND	0.250	"								
N-nitroso-di-n-propylamine	ND	0.250	"								
N-Nitrosodimethylamine	ND	0.250	"								
N-Nitrosodiphenylamine	ND	0.250	"								
Pentachlorophenol	ND	0.250	"								
Phenanthrene	ND	0.250	"								
Phenol	ND	0.250	"								
Pyrene	ND	0.250	"								
Pyridine	ND	0.250	"								
1,2,4-Trichlorobenzene	ND	0.250	"								
2,4,5-Trichlorophenol	ND	0.250	"								
2,4,6-Trichlorophenol	ND	0.250	"								
Surrogate: 2,4,6-Tribromophenol	*2.56*		*"*	*3.75*		*68.4*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*1.56*		*"*	*2.50*		*62.4*	*30-130*				
Surrogate: 2-Fluorophenol	*1.31*		*"*	*3.75*		*35.0*	*15-110*				
Surrogate: Nitrobenzene-d5	*0.606*		*"*	*2.50*		*24.3*	*30-130*				
Surrogate: Phenol-d5	*2.20*		*"*	*3.76*		*58.6*	*15-110*				
Surrogate: Terphenyl-d14	*2.37*		*"*	*2.50*		*94.8*	*30-130*				
LCS (BE31031-BS1)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
Acenaphthene	2.22	0.250	mg/kg wet	2.50		89.0	31.1-109				
Acenaphthylene	2.11	0.250	"	2.50		84.6	31.1-106				
Aniline	1.61	0.250	"	2.50		64.6	5.07-149				
Anthracene	2.27	0.250	"	2.50		90.9	31.5-107				
Benzo(a)anthracene	2.15	0.250	"	2.50		86.0	31.5-115				
Benzo(a)pyrene	2.58	0.250	"	2.50		103	29.1-138				
Benzo(b)fluoranthene	2.05	0.250	"	2.50		82.0	14.9-131				
Benzo(g,h,i)perylene	1.19	0.250	"	2.50		47.4	6.56-121				
Benzyl alcohol	2.05	0.250	"	2.50		82.1	25.4-119				
Benzo(k)fluoranthene	2.24	0.250	"	2.50		89.6	29.1-121				
Benzyl butyl phthalate	2.35	0.250	"	2.50		93.9	31.3-112				
4-Bromophenyl phenyl ether	2.19	0.250	"	2.50		87.8	25.2-113				
4-Chloro-3-methylphenol	2.20	0.250	"	2.50		87.9	29.5-124				
4-Chloroaniline	1.84	0.250	"	2.50		73.6	10-177				
Bis(2-chloroethoxy)methane	2.02	0.250	"	2.50		80.6	27.9-111				
Bis(2-chloroethyl)ether	1.96	0.250	"	2.50		78.6	18-122				
Bis(2-chloroisopropyl)ether	1.90	0.250	"	2.50		76.1	9.62-123				
Bis(2-ethylhexyl)phthalate	2.40	0.250	"	2.50		96.1	25-105				
2-Chloronaphthalene	2.08	0.250	"	2.50		83.2	31.7-108				
2-Chlorophenol	1.97	0.250	"	2.50		78.7	20.3-125				
4-Chlorophenyl phenyl ether	2.38	0.250	"	2.50		95.1	23.6-110				
Chrysene	2.26	0.250	"	2.50		90.4	27.4-117				
Dibenzo(a,h)anthracene	1.74	0.250	"	2.50		69.7	14.6-119				
Dibenzofuran	2.24	0.250	"	2.50		89.6	30.2-108				
Di-n-butyl phthalate	2.19	0.250	"	2.50		87.4	33.5-100				
1,2-Dichlorobenzene	1.76	0.250	"	2.50		70.3	22.8-114				
1,4-Dichlorobenzene	1.86	0.250	"	2.50		74.3	19.8-121				



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

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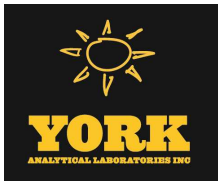
Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31031 - EPA 3550B											
LCS (BE31031-BS1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
1,3-Dichlorobenzene	1.72	0.250	mg/kg wet	2.50		68.9	20.6-119				
3,3'-Dichlorobenzidine	2.15	0.250	"	2.50		86.0	10-180				
2,4-Dichlorophenol	2.15	0.250	"	2.50		85.9	23.3-125				
Diethyl phthalate	2.28	0.250	"	2.50		91.2	29.7-111				
2,4-Dimethylphenol	2.00	0.250	"	2.50		80.0	29.8-115				
Dimethyl phthalate	2.17	0.250	"	2.50		86.8	27-118				
2-Nitroaniline	2.27	0.250	"	2.50		90.9	40-140				
4,6-Dinitro-2-methylphenol	2.15	0.500	"	2.50		86.1	10-122				
2,4-Dinitrophenol	2.01	0.500	"	2.50		80.4	10-151				
2,6-Dinitrotoluene	2.36	0.250	"	2.50		94.5	26.1-119				
2,4-Dinitrotoluene	2.34	0.250	"	2.50		93.5	21.4-126				
Di-n-octyl phthalate	2.29	0.250	"	2.50		91.4	19-129				
Fluoranthene	2.22	0.250	"	2.50		88.8	31.3-110				
Fluorene	2.36	0.250	"	2.50		94.4	29.9-108				
Hexachlorobenzene	2.13	0.250	"	2.50		85.2	31.7-102				
Hexachlorobutadiene	2.01	0.250	"	2.50		80.4	10.1-134				
Hexachlorocyclopentadiene	1.62	0.250	"	2.50		65.0	10-122				
Hexachloroethane	1.81	0.250	"	2.50		72.5	20.2-114				
Indeno(1,2,3-cd)pyrene	1.71	0.250	"	2.50		68.4	12.6-120				
Isophorone	2.00	0.250	"	2.50		79.9	27.2-113				
2-Methylnaphthalene	2.05	0.250	"	2.50		81.8	17.4-119				
2-Methylphenol	2.11	0.250	"	2.50		84.5	23.6-125				
3- & 4-Methylphenols	2.04	0.250	"	2.50		81.4	21.3-115				
Naphthalene	2.01	0.250	"	2.50		80.4	25.2-111				
3-Nitroaniline	2.16	0.250	"	2.50		86.5	9.73-147				
4-Nitroaniline	2.03	0.250	"	2.50		81.1	6.42-169				
Nitrobenzene	1.86	0.250	"	2.50		74.6	21.8-118				
4-Nitrophenol	2.37	0.250	"	2.50		94.9	10-136				
2-Nitrophenol	1.98	0.250	"	2.50		79.3	20.6-119				
N-nitroso-di-n-propylamine	2.10	0.250	"	2.50		83.9	25.3-118				
N-Nitrosodimethylamine	1.68	0.250	"	2.50		67.3	10-142				
N-Nitrosodiphenylamine	2.80	0.250	"	2.50		112	35.8-132				
Pentachlorophenol	2.30	0.250	"	2.50		92.1	3.68-146				
Phenanthrene	2.21	0.250	"	2.50		88.2	31.2-105				
Phenol	2.00	0.250	"	2.50		80.0	23.2-117				
Pyrene	2.44	0.250	"	2.50		97.7	26.3-124				
Pyridine	1.47	0.250	"	2.50		58.7	10-122				
1,2,4-Trichlorobenzene	1.99	0.250	"	2.50		79.7	19.3-128				
2,4,5-Trichlorophenol	2.18	0.250	"	2.50		87.2	19.5-131				
2,4,6-Trichlorophenol	2.11	0.250	"	2.50		84.3	24.2-123				
Surrogate: 2,4,6-Tribromophenol	*3.44*		*"*	*3.75*		*91.6*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*2.02*		*"*	*2.50*		*80.5*	*30-130*				
Surrogate: 2-Fluorophenol	*2.88*		*"*	*3.75*		*76.9*	*15-110*				
Surrogate: Nitrobenzene-d5	*1.73*		*"*	*2.50*		*69.3*	*30-130*				
Surrogate: Phenol-d5	*2.98*		*"*	*3.76*		*79.3*	*15-110*				
Surrogate: Terphenyl-d14	*2.48*		*"*	*2.50*		*99.2*	*30-130*				



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

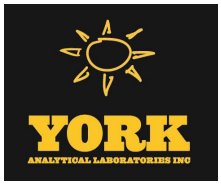
Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31031 - EPA 3550B											
LCS Dup (BE31031-BSD1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
Acenaphthene	2.10	0.250	mg/kg wet	2.50		84.2	31.1-109		5.57	30	
Acenaphthylene	2.02	0.250	"	2.50		80.8	31.1-106		4.55	30	
Aniline	1.52	0.250	"	2.50		60.9	5.07-149		5.83	30	
Anthracene	2.21	0.250	"	2.50		88.6	31.5-107		2.54	30	
Benzo(a)anthracene	2.03	0.250	"	2.50		81.4	31.5-115		5.54	30	
Benzo(a)pyrene	2.27	0.250	"	2.50		90.7	29.1-138		12.9	30	
Benzo(b)fluoranthene	1.93	0.250	"	2.50		77.2	14.9-131		6.03	30	
Benzo(g,h,i)perylene	1.10	0.250	"	2.50		43.9	6.56-121		7.80	30	
Benzyl alcohol	1.93	0.250	"	2.50		77.2	25.4-119		6.20	30	
Benzo(k)fluoranthene	2.11	0.250	"	2.50		84.4	29.1-121		5.93	30	
Benzyl butyl phthalate	2.17	0.250	"	2.50		86.8	31.3-112		7.84	30	
4-Bromophenyl phenyl ether	2.12	0.250	"	2.50		84.7	25.2-113		3.60	30	
4-Chloro-3-methylphenol	2.02	0.250	"	2.50		80.9	29.5-124		8.29	30	
4-Chloroaniline	1.79	0.250	"	2.50		71.7	10-177		2.53	30	
Bis(2-chloroethoxy)methane	1.90	0.250	"	2.50		76.2	27.9-111		5.64	30	
Bis(2-chloroethyl)ether	1.83	0.250	"	2.50		73.2	18-122		7.06	30	
Bis(2-chloroisopropyl)ether	1.75	0.250	"	2.50		69.8	9.62-123		8.58	30	
Bis(2-ethylhexyl)phthalate	2.24	0.250	"	2.50		89.8	25-105		6.80	30	
2-Chloronaphthalene	2.03	0.250	"	2.50		81.2	31.7-108		2.53	30	
2-Chlorophenol	1.85	0.250	"	2.50		73.9	20.3-125		6.27	30	
4-Chlorophenyl phenyl ether	2.26	0.250	"	2.50		90.5	23.6-110		4.94	30	
Chrysene	2.11	0.250	"	2.50		84.4	27.4-117		6.93	30	
Dibenzo(a,h)anthracene	1.56	0.250	"	2.50		62.3	14.6-119		11.2	30	
Dibenzofuran	2.14	0.250	"	2.50		85.4	30.2-108		4.82	30	
Di-n-butyl phthalate	2.08	0.250	"	2.50		83.0	33.5-100		5.16	30	
1,2-Dichlorobenzene	1.66	0.250	"	2.50		66.4	22.8-114		5.65	30	
1,4-Dichlorobenzene	1.74	0.250	"	2.50		69.7	19.8-121		6.36	30	
1,3-Dichlorobenzene	1.66	0.250	"	2.50		66.3	20.6-119		3.84	30	
3,3'-Dichlorobenzidine	2.07	0.250	"	2.50		82.9	10-180		3.74	30	
2,4-Dichlorophenol	2.02	0.250	"	2.50		80.6	23.3-125		6.41	30	
Diethyl phthalate	2.07	0.250	"	2.50		82.8	29.7-111		9.67	30	
2,4-Dimethylphenol	1.82	0.250	"	2.50		72.7	29.8-115		9.58	30	
Dimethyl phthalate	2.02	0.250	"	2.50		80.8	27-118		7.14	30	
2-Nitroaniline	2.14	0.250	"	2.50		85.5	40-140		6.08	30	
4,6-Dinitro-2-methylphenol	2.02	0.500	"	2.50		80.8	10-122		6.30	30	
2,4-Dinitrophenol	1.84	0.500	"	2.50		73.5	10-151		8.94	30	
2,6-Dinitrotoluene	2.21	0.250	"	2.50		88.5	26.1-119		6.60	30	
2,4-Dinitrotoluene	2.17	0.250	"	2.50		86.9	21.4-126		7.29	30	
Di-n-octyl phthalate	2.16	0.250	"	2.50		86.3	19-129		5.72	30	
Fluoranthene	2.19	0.250	"	2.50		87.7	31.3-110		1.25	30	
Fluorene	2.23	0.250	"	2.50		89.4	29.9-108		5.42	30	
Hexachlorobenzene	2.03	0.250	"	2.50		81.2	31.7-102		4.86	30	
Hexachlorobutadiene	1.87	0.250	"	2.50		74.6	10.1-134		7.41	30	
Hexachlorocyclopentadiene	1.59	0.250	"	2.50		63.5	10-122		2.37	30	
Hexachloroethane	1.72	0.250	"	2.50		68.8	20.2-114		5.30	30	
Indeno(1,2,3-cd)pyrene	1.55	0.250	"	2.50		62.2	12.6-120		9.50	30	
Isophorone	1.86	0.250	"	2.50		74.5	27.2-113		7.04	30	
2-Methylnaphthalene	1.92	0.250	"	2.50		76.7	17.4-119		6.51	30	
2-Methylphenol	2.02	0.250	"	2.50		80.6	23.6-125		4.70	30	
3- & 4-Methylphenols	1.93	0.250	"	2.50		77.1	21.3-115		5.43	30	
Naphthalene	1.87	0.250	"	2.50		74.9	25.2-111		7.11	30	



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31031 - EPA 3550B											
LCS Dup (BE31031-BSD1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
3-Nitroaniline	2.13	0.250	mg/kg wet	2.50		85.2	9.73-147		1.54	30	
4-Nitroaniline	2.02	0.250	"	2.50		80.9	6.42-169		0.247	30	
Nitrobenzene	1.74	0.250	"	2.50		69.8	21.8-118		6.65	30	
4-Nitrophenol	2.18	0.250	"	2.50		87.0	10-136		8.64	30	
2-Nitrophenol	1.85	0.250	"	2.50		74.1	20.6-119		6.78	30	
N-nitroso-di-n-propylamine	1.98	0.250	"	2.50		79.3	25.3-118		5.59	30	
N-Nitrosodimethylamine	1.61	0.250	"	2.50		64.4	10-142		4.43	30	
N-Nitrosodiphenylamine	2.71	0.250	"	2.50		109	35.8-132		3.23	30	
Pentachlorophenol	2.22	0.250	"	2.50		88.8	3.68-146		3.63	30	
Phenanthrene	2.09	0.250	"	2.50		83.8	31.2-105		5.21	30	
Phenol	1.88	0.250	"	2.50		75.2	23.2-117		6.18	30	
Pyrene	2.23	0.250	"	2.50		89.0	26.3-124		9.34	30	
Pyridine	1.39	0.250	"	2.50		55.8	10-122		5.07	30	
1,2,4-Trichlorobenzene	1.85	0.250	"	2.50		73.8	19.3-128		7.64	30	
2,4,5-Trichlorophenol	2.07	0.250	"	2.50		82.9	19.5-131		5.03	30	
2,4,6-Trichlorophenol	2.07	0.250	"	2.50		82.7	24.2-123		1.92	30	
Surrogate: 2,4,6-Tribromophenol	*3.28*		*"*	*3.75*		*87.3*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*1.92*		*"*	*2.50*		*76.7*	*30-130*				
Surrogate: 2-Fluorophenol	*2.73*		*"*	*3.75*		*72.7*	*15-110*				
Surrogate: Nitrobenzene-d5	*1.63*		*"*	*2.50*		*65.3*	*30-130*				
Surrogate: Phenol-d5	*2.79*		*"*	*3.76*		*74.2*	*15-110*				
Surrogate: Terphenyl-d14	*2.25*		*"*	*2.50*		*89.9*	*30-130*				
Matrix Spike (BE31031-MS1)	*Source sample: 13E0711-02 (MW-7 (7-9))							Prepared: 05/22/2013 Analyzed: 05/23/2013			
Acenaphthene	2.12	0.274	mg/kg dry	2.74	ND	77.4	31.1-109				
Acenaphthylene	1.98	0.274	"	2.74	ND	72.3	31.1-106				
Aniline	1.31	0.274	"	2.74	ND	47.7	21-140				
Anthracene	2.18	0.274	"	2.74	ND	79.7	31.5-107				
Benzo(a)anthracene	1.99	0.274	"	2.74	ND	72.5	31.5-115				
Benzo(a)pyrene	2.41	0.274	"	2.74	ND	87.8	29.1-138				
Benzo(b)fluoranthene	1.96	0.274	"	2.74	ND	71.4	14.9-131				
Benzo(g,h,i)perylene	1.62	0.274	"	2.74	ND	59.0	6.56-121				
Benzyl alcohol	1.88	0.274	"	2.74	ND	68.5	25.4-119				
Benzo(k)fluoranthene	2.02	0.274	"	2.74	ND	73.8	29.1-121				
Benzyl butyl phthalate	2.27	0.274	"	2.74	ND	82.9	31.3-112				
4-Bromophenyl phenyl ether	2.12	0.274	"	2.74	ND	77.3	25.2-113				
4-Chloro-3-methylphenol	2.02	0.274	"	2.74	ND	73.7	29.5-124				
4-Chloroaniline	1.89	0.274	"	2.74	ND	68.9	10-177				
Bis(2-chloroethoxy)methane	1.74	0.274	"	2.74	ND	63.3	27.9-111				
Bis(2-chloroethyl)ether	1.53	0.274	"	2.74	ND	56.0	18-122				
Bis(2-chloroisopropyl)ether	1.39	0.274	"	2.74	ND	50.6	9.62-123				
Bis(2-ethylhexyl)phthalate	2.38	0.274	"	2.74	ND	86.8	25-105				
2-Chloronaphthalene	1.94	0.274	"	2.74	ND	70.7	31.7-108				
2-Chlorophenol	1.61	0.274	"	2.74	ND	58.8	20.3-125				
4-Chlorophenyl phenyl ether	2.22	0.274	"	2.74	ND	80.9	23.6-110				
Chrysene	2.22	0.274	"	2.74	ND	80.8	27.4-117				
Dibenzo(a,h)anthracene	2.05	0.274	"	2.74	ND	74.9	14.6-119				
Dibenzofuran	2.16	0.274	"	2.74	ND	78.7	30.2-108				
Di-n-butyl phthalate	2.09	0.274	"	2.74	ND	76.3	33.5-100				
1,2-Dichlorobenzene	1.28	0.274	"	2.74	ND	46.7	22.8-114				
1,4-Dichlorobenzene	1.34	0.274	"	2.74	ND	49.0	19.8-121				



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

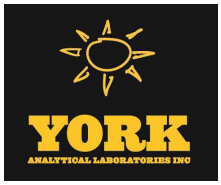
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31031 - EPA 3550B											
Matrix Spike (BE31031-MS1)	*Source sample: 13E0711-02 (MW-7 (7-9))							Prepared: 05/22/2013 Analyzed: 05/23/2013			
1,3-Dichlorobenzene	1.22	0.274	mg/kg dry	2.74	ND	44.5	20.6-119				
3,3'-Dichlorobenzidine	1.58	0.274	"	2.74	ND	57.6	10-180				
2,4-Dichlorophenol	1.95	0.274	"	2.74	ND	71.2	23.3-125				
Diethyl phthalate	2.05	0.274	"	2.74	ND	74.9	29.7-111				
2,4-Dimethylphenol	1.23	0.274	"	2.74	ND	44.8	29.8-115				
Dimethyl phthalate	1.98	0.274	"	2.74	ND	72.2	27-118				
2-Nitroaniline	2.16	0.274	"	2.74	ND	78.8	40-140				
4,6-Dinitro-2-methylphenol	1.87	0.548	"	2.74	ND	68.2	10-122				
2,4-Dinitrophenol	1.58	0.548	"	2.74	ND	57.5	10-151				
2,6-Dinitrotoluene	2.19	0.274	"	2.74	ND	79.8	26.1-119				
2,4-Dinitrotoluene	2.17	0.274	"	2.74	ND	79.1	21.4-126				
Di-n-octyl phthalate	2.14	0.274	"	2.74	ND	78.0	19-129				
Fluoranthene	2.13	0.274	"	2.74	ND	77.6	31.3-110				
Fluorene	2.24	0.274	"	2.74	ND	81.8	29.9-108				
Hexachlorobenzene	2.10	0.274	"	2.74	ND	76.5	31.7-102				
Hexachlorobutadiene	1.38	0.274	"	2.74	ND	50.5	10.1-134				
Hexachlorocyclopentadiene	1.13	0.274	"	2.74	ND	41.1	10-122				
Hexachloroethane	1.28	0.274	"	2.74	ND	46.7	20.2-114				
Indeno(1,2,3-cd)pyrene	1.99	0.274	"	2.74	ND	72.4	12.6-120				
Isophorone	1.75	0.274	"	2.74	ND	63.7	27.2-113				
2-Methylnaphthalene	1.80	0.274	"	2.74	ND	65.8	17.4-119				
2-Methylphenol	1.68	0.274	"	2.74	ND	61.4	23.6-125				
3- & 4-Methylphenols	1.71	0.274	"	2.74	ND	62.2	21.3-115				
Naphthalene	1.63	0.274	"	2.74	ND	59.3	25.2-111				
3-Nitroaniline	2.27	0.274	"	2.74	ND	82.8	9.73-147				
4-Nitroaniline	2.35	0.274	"	2.74	ND	85.8	6.42-169				
Nitrobenzene	1.52	0.274	"	2.74	ND	55.4	21.8-118				
4-Nitrophenol	2.29	0.274	"	2.74	ND	83.6	10-136				
2-Nitrophenol	1.62	0.274	"	2.74	ND	59.1	20.6-119				
N-nitroso-di-n-propylamine	1.81	0.274	"	2.74	ND	65.8	25.3-118				
N-Nitrosodimethylamine	1.36	0.274	"	2.74	ND	49.7	21-140				
N-Nitrosodiphenylamine	2.13	0.274	"	2.74	ND	77.7	35.8-132				
Pentachlorophenol	2.17	0.274	"	2.74	ND	79.2	3.68-146				
Phenanthrene	2.15	0.274	"	2.74	ND	78.5	31.2-105				
Phenol	1.72	0.274	"	2.74	ND	62.6	23.2-117				
Pyrene	2.50	0.274	"	2.74	ND	91.1	26.3-124				
Pyridine	1.10	0.274	"	2.74	ND	40.2	21-140				
1,2,4-Trichlorobenzene	1.52	0.274	"	2.74	ND	55.5	19.3-128				
2,4,5-Trichlorophenol	2.05	0.274	"	2.74	ND	74.9	19.5-131				
2,4,6-Trichlorophenol	1.95	0.274	"	2.74	ND	70.9	24.2-123				
Surrogate: 2,4,6-Tribromophenol	*3.05*		*"*	*4.11*		*74.3*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*1.68*		*"*	*2.75*		*61.1*	*30-130*				
Surrogate: 2-Fluorophenol	*1.90*		*"*	*4.11*		*46.2*	*15-110*				
Surrogate: Nitrobenzene-d5	*1.04*		*"*	*2.74*		*37.8*	*30-130*				
Surrogate: Phenol-d5	*2.37*		*"*	*4.12*		*57.4*	*15-110*				
Surrogate: Terphenyl-d14	*2.50*		*"*	*2.74*		*91.1*	*30-130*				

Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31033 - EPA 3550B											
Blank (BE31033-BLK1)											Prepared: 05/22/2013 Analyzed: 05/23/2013
Toxaphene	ND	0.0250	mg/kg wet								
Methoxychlor	ND	0.00248	"								
Heptachlor epoxide	ND	0.000495	"								
Heptachlor	ND	0.000495	"								
gamma-BHC (Lindane)	ND	0.000495	"								
Endrin ketone	ND	0.000495	"								
Endrin aldehyde	ND	0.000495	"								
Endrin	ND	0.000495	"								
Endosulfan sulfate	ND	0.000495	"								
Endosulfan II	ND	0.000495	"								
Endosulfan I	ND	0.000495	"								
Dieldrin	ND	0.000495	"								
delta-BHC	ND	0.000495	"								
Chlordane, total	ND	0.00198	"								
beta-BHC	ND	0.000495	"								
alpha-BHC	ND	0.000495	"								
Aldrin	ND	0.000495	"								
4,4'-DDT	ND	0.000495	"								
4,4'-DDE	ND	0.000495	"								
4,4'-DDD	ND	0.000495	"								
Aroclor 1260	ND	0.0255	"								
Aroclor 1254	ND	0.0255	"								
Aroclor 1248	ND	0.0255	"								
Aroclor 1242	ND	0.0255	"								
Aroclor 1232	ND	0.0255	"								
Aroclor 1221	ND	0.0255	"								
Aroclor 1016	ND	0.0255	"								
Total PCBs	ND	0.0255	"								
Surrogate: Tetrachloro-m-xylene	*0.0801*		"	*0.100*		*80.1*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0739*		"	*0.100*		*73.5*	*30-150*				



Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31033 - EPA 3550B											
LCS (BE31033-BS1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
Methoxychlor	0.0353	0.00248	mg/kg wet	0.0500		70.6	40-140				
Heptachlor epoxide	0.0378	0.000495	"	0.0500		75.6	40-140				
Heptachlor	0.0301	0.000495	"	0.0500		60.2	40-140				
gamma-BHC (Lindane)	0.0391	0.000495	"	0.0500		78.2	40-140				
Endrin ketone	0.0348	0.000495	"	0.0500		69.6	40-140				
Endrin aldehyde	0.0361	0.000495	"	0.0500		72.3	40-140				
Endrin	0.0350	0.000495	"	0.0500		70.0	40-140				
Endosulfan sulfate	0.0267	0.000495	"	0.0500		53.4	40-140				
Endosulfan II	0.0304	0.000495	"	0.0500		60.8	40-140				
Endosulfan I	0.0376	0.000495	"	0.0500		75.3	40-140				
Dieldrin	0.0390	0.000495	"	0.0500		77.9	40-140				
delta-BHC	0.0364	0.000495	"	0.0500		72.8	40-140				
beta-BHC	0.0384	0.000495	"	0.0500		76.8	40-140				
alpha-BHC	0.0402	0.000495	"	0.0500		80.3	40-140				
Aldrin	0.0404	0.000495	"	0.0500		80.9	40-140				
4,4'-DDT	0.0438	0.000495	"	0.0500		87.6	40-140				
4,4'-DDE	0.0394	0.000495	"	0.0500		78.8	40-140				
4,4'-DDD	0.0400	0.000495	"	0.0500		80.1	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0807*		*"*	*0.100*		*80.7*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0755*		*"*	*0.100*		*75.2*	*30-150*				
LCS (BE31033-BS2)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
Aroclor 1260	0.359	0.0255	mg/kg wet	0.500		71.7	40-140				
Aroclor 1016	0.393	0.0255	"	0.500		78.6	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0735*		*"*	*0.100*		*73.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0640*		*"*	*0.100*		*63.7*	*30-150*				
LCS Dup (BE31033-BSD1)								Prepared: 05/22/2013 Analyzed: 05/23/2013			
Methoxychlor	0.0347	0.00248	mg/kg wet	0.0500		69.4	40-140		1.79	200	
Heptachlor epoxide	0.0392	0.000495	"	0.0500		78.4	40-140		3.65	200	
Heptachlor	0.0324	0.000495	"	0.0500		64.7	40-140		7.21	200	
gamma-BHC (Lindane)	0.0403	0.000495	"	0.0500		80.5	40-140		2.90	200	
Endrin ketone	0.0361	0.000495	"	0.0500		72.2	40-140		3.71	200	
Endrin aldehyde	0.0382	0.000495	"	0.0500		76.3	40-140		5.44	200	
Endrin	0.0359	0.000495	"	0.0500		71.8	40-140		2.44	200	
Endosulfan sulfate	0.0281	0.000495	"	0.0500		56.2	40-140		5.07	200	
Endosulfan II	0.0330	0.000495	"	0.0500		66.0	40-140		8.17	200	
Endosulfan I	0.0397	0.000495	"	0.0500		79.3	40-140		5.21	200	
Dieldrin	0.0409	0.000495	"	0.0500		81.8	40-140		4.83	200	
delta-BHC	0.0373	0.000495	"	0.0500		74.7	40-140		2.60	200	
beta-BHC	0.0398	0.000495	"	0.0500		79.5	40-140		3.42	200	
alpha-BHC	0.0411	0.000495	"	0.0500		82.3	40-140		2.36	200	
Aldrin	0.0405	0.000495	"	0.0500		81.0	40-140		0.151	200	
4,4'-DDT	0.0446	0.000495	"	0.0500		89.2	40-140		1.75	200	
4,4'-DDE	0.0395	0.000495	"	0.0500		79.0	40-140		0.255	200	
4,4'-DDD	0.0403	0.000495	"	0.0500		80.5	40-140		0.578	200	
Surrogate: Tetrachloro-m-xylene	*0.0846*		*"*	*0.100*		*84.6*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0750*		*"*	*0.100*		*74.7*	*30-150*				

Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31033 - EPA 3550B											
LCS Dup (BE31033-BSD2)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
Aroclor 1260	0.340	0.0255	mg/kg wet	0.500		68.1	40-140		5.24	25	
Aroclor 1016	0.377	0.0255	"	0.500		75.5	40-140		4.05	25	
Surrogate: Tetrachloro-m-xylene	*0.0700*		*"*	*0.100*		*70.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0600*		*"*	*0.100*		*59.7*	*30-150*				
Matrix Spike (BE31033-MS1)	*Source sample: 13E0711-03 (MW-9 (0-2))								Prepared: 05/22/2013 Analyzed: 05/23/2013		
Methoxychlor	0.0450	0.0137	mg/kg dry	0.0552	ND	81.6	30-150				
Heptachlor epoxide	0.0462	0.00273	"	0.0552	ND	83.7	30-150				
Heptachlor	0.0494	0.00273	"	0.0552	ND	89.5	30-150				
gamma-BHC (Lindane)	0.0470	0.00273	"	0.0552	ND	85.2	30-150				
Endrin ketone	0.0428	0.00273	"	0.0552	ND	77.6	30-150				
Endrin aldehyde	0.0402	0.00273	"	0.0552	ND	72.9	30-150				
Endrin	0.0506	0.00273	"	0.0552	ND	91.7	30-150				
Endosulfan sulfate	0.0382	0.00273	"	0.0552	ND	69.3	30-150				
Endosulfan II	0.0398	0.00273	"	0.0552	ND	72.1	30-150				
Endosulfan I	0.0400	0.00273	"	0.0552	ND	72.6	30-150				
Dieldrin	0.0449	0.00273	"	0.0552	ND	81.3	30-150				
delta-BHC	0.0414	0.00273	"	0.0552	ND	75.0	30-150				
beta-BHC	0.0364	0.00273	"	0.0552	ND	66.1	30-150				
alpha-BHC	0.0446	0.00273	"	0.0552	ND	80.8	30-150				
Aldrin	0.0463	0.00273	"	0.0552	ND	84.0	30-150				
4,4'-DDT	0.0463	0.00273	"	0.0552	ND	83.9	30-150				
4,4'-DDE	0.0360	0.00273	"	0.0552	ND	65.2	30-150				
4,4'-DDD	0.0458	0.00273	"	0.0552	ND	82.9	30-150				
Surrogate: Tetrachloro-m-xylene	*0.106*		*"*	*0.110*		*96.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0874*		*"*	*0.111*		*78.8*	*30-150*				

Polychlorinated Biphenyls (PCB) by EPA SW 846-8082/EPA Compendium Methods - Quality Control Data

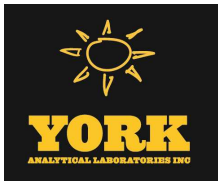
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31033 - EPA 3550B											
Blank (BE31033-BLK1)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
Aroclor 1016	ND	0.0255	mg/kg wet								
Aroclor 1221	ND	0.0255	"								
Aroclor 1232	ND	0.0255	"								
Aroclor 1242	ND	0.0255	"								
Aroclor 1248	ND	0.0255	"								
Aroclor 1254	ND	0.0255	"								
Aroclor 1260	ND	0.0255	"								
Total PCBs	ND	0.0255	"								
Surrogate: Tetrachloro-m-xylene	*0.0865*		*"*	*0.100*		*86.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0690*		*"*	*0.100*		*68.7*	*30-150*				
LCS (BE31033-BS2)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
Aroclor 1016	0.393	0.0255	mg/kg wet	0.500		78.6	40-140				
Aroclor 1260	0.359	0.0255	"	0.500		71.7	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0735*		*"*	*0.100*		*73.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0640*		*"*	*0.100*		*63.7*	*30-150*				
LCS Dup (BE31033-BSD2)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
Aroclor 1016	0.377	0.0255	mg/kg wet	0.500		75.5	40-140		4.05	25	
Aroclor 1260	0.340	0.0255	"	0.500		68.1	40-140		5.24	25	
Surrogate: Tetrachloro-m-xylene	*0.0700*		*"*	*0.100*		*70.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0600*		*"*	*0.100*		*59.7*	*30-150*				
Matrix Spike (BE31033-MS2)	*Source sample: 13E0711-02 (MW-7 (7-9))								Prepared: 05/22/2013 Analyzed: 05/23/2013		
Aroclor 1016	0.362	0.0280	mg/kg dry	0.548	ND	66.0	40-140				
Aroclor 1260	0.295	0.0280	"	0.548	ND	53.7	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0669*		*"*	*0.110*		*61.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0521*		*"*	*0.110*		*47.3*	*30-150*				

Metals by EPA 6000 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31041 - EPA 3050B											
Blank (BE31041-BLK1)									Prepared & Analyzed: 05/22/2013		
Aluminum	ND	2.00	mg/kg wet								
Antimony	ND	0.500	"								
Arsenic	ND	1.00	"								
Barium	ND	0.500	"								
Beryllium	ND	0.100	"								
Cadmium	ND	0.500	"								
Calcium	ND	5.00	"								
Chromium	ND	0.500	"								
Cobalt	ND	0.500	"								
Copper	ND	0.500	"								
Iron	ND	2.00	"								
Lead	ND	0.300	"								
Magnesium	ND	5.00	"								
Manganese	ND	1.00	"								
Nickel	ND	0.500	"								
Potassium	19.2	10.0	"								
Selenium	ND	0.500	"								
Silver	ND	0.500	"								
Sodium	159	10.0	"								
Thallium	ND	0.500	"								
Vanadium	ND	0.500	"								
Zinc	ND	0.500	"								
Duplicate (BE31041-DUP1)	*Source sample: 13E0711-02 (MW-7 (7-9))								Prepared & Analyzed: 05/22/2013		
Aluminum	9910	2.19	mg/kg dry		9940				0.314	35	
Antimony	ND	0.548	"		ND					35	
Arsenic	2.67	1.10	"		2.65				0.816	35	
Barium	144	0.548	"		143				0.942	35	
Beryllium	ND	0.110	"		ND					35	
Cadmium	ND	0.548	"		ND					35	
Calcium	2990	5.48	"		2980				0.351	35	
Chromium	17.1	0.548	"		17.0				0.670	35	
Cobalt	9.13	0.548	"		9.04				1.06	35	
Copper	13.1	0.548	"		12.9				1.02	35	
Iron	16900	2.19	"		16900				0.0446	35	
Lead	9.52	0.329	"		9.87				3.58	35	
Magnesium	5380	5.48	"		5410				0.639	35	
Manganese	219	1.10	"		215				1.52	35	
Nickel	15.8	0.548	"		15.8				0.124	35	
Potassium	3810	11.0	"		3820				0.279	35	
Selenium	ND	0.548	"		ND					35	
Silver	ND	0.548	"		ND					35	
Sodium	186	11.0	"		188				0.886	35	
Thallium	ND	0.548	"		ND					35	
Vanadium	36.9	0.548	"		36.6				0.604	35	
Zinc	48.9	0.548	"		49.3				0.768	35	



Metals by EPA 6000 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31041 - EPA 3050B											
Matrix Spike (BE31041-MS1)	*Source sample: 13E0711-02 (MW-7 (7-9))							Prepared & Analyzed: 05/22/2013			
Aluminum	10100	2.19	mg/kg dry	219	9940	69.9	75-125	Low Bias			
Antimony	30.0	0.548	"	27.4	ND	109	75-125				
Arsenic	231	1.10	"	219	2.65	104	75-125				
Barium	366	0.548	"	219	143	102	75-125				
Beryllium	0.769	0.110	"	5.48	ND	14.0	75-125	Low Bias			
Cadmium	5.57	0.548	"	5.48	ND	101	75-125				
Chromium	41.0	0.548	"	21.9	17.0	109	75-125				
Cobalt	66.5	0.548	"	54.8	9.04	105	75-125				
Copper	41.7	0.548	"	27.4	12.9	105	75-125				
Iron	17200	2.19	"	110	16900	302	75-125	High Bias			
Lead	64.8	0.329	"	54.8	9.87	100	75-125				
Magnesium	5430	5.48	"		5410		75-125				
Manganese	270	1.10	"	54.8	215	99.3	75-125				
Nickel	73.8	0.548	"	54.8	15.8	106	75-125				
Potassium	3760	11.0	"		3820		75-125				
Silver	ND	0.548	"	5.48	ND		75-125	Low Bias			
Sodium	181	11.0	"		188		75-125				
Thallium	214	0.548	"	219	ND	97.7	75-125				
Vanadium	89.3	0.548	"	54.8	36.6	96.0	75-125				
Zinc	106	0.548	"	54.8	49.3	104	75-125				
Reference (BE31041-SRM1)								Prepared & Analyzed: 05/22/2013			
Aluminum	8730	2.00	mg/kg wet	8360		104	40.4-159				
Antimony	102	0.500	"	92.9		110	24.8-272				
Arsenic	97.4	1.00	"	94.5		103	69.2-131				
Barium	163	0.500	"	166		98.4	72.9-127				
Beryllium	53.7	0.100	"	52.6		102	73-127				
Cadmium	58.7	0.500	"	59.9		98.0	73.1-127				
Calcium	5860	5.00	"	6160		95.1	73.9-126				
Chromium	69.5	0.500	"	69.3		100	68.4-132				
Cobalt	106	0.500	"	101		104	74.2-125				
Copper	83.2	0.500	"	78.0		107	73.6-126				
Iron	13100	2.00	"	12800		102	31.8-168				
Lead	89.3	0.300	"	91.7		97.4	70.2-130				
Magnesium	3000	5.00	"	3030		98.9	66-134				
Manganese	283	1.00	"	283		99.9	73.9-125				
Nickel	64.4	0.500	"	56.6		114	70-130				
Potassium	3830	10.0	"	3820		100	64.7-136				
Selenium	164	0.500	"	159		103	67.9-133				
Silver	33.1	0.500	"	33.9		97.8	65.5-135				
Sodium	852	10.0	"	652		131	55.1-145				
Thallium	114	0.500	"	119		96.1	67.6-133				
Vanadium	55.9	0.500	"	56.3		99.3	53.3-147				
Zinc	138	0.500	"	137		101	67.4-133				

Mercury by EPA 7000/200 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31043 - EPA SW846-7471											
Blank (BE31043-BLK1)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
Mercury	ND	0.0330	mg/kg wet								
LCS (BE31043-BS1)									Prepared: 05/22/2013 Analyzed: 05/23/2013		
Mercury	3.01		mg/kg	3.73		80.7	67.6-131				
Duplicate (BE31043-DUP1)	*Source sample: 13E0711-01 (MW-7 (1-5))								Prepared: 05/22/2013 Analyzed: 05/23/2013		
Mercury	ND	0.0362	mg/kg dry		ND					35	
Matrix Spike (BE31043-MS1)	*Source sample: 13E0711-01 (MW-7 (1-5))								Prepared: 05/22/2013 Analyzed: 05/23/2013		
Mercury	0.320		mg/kg	0.333	ND	96.1	75-125				

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
13E0711-01	MW-7 (1-5)	Encore Sampler
13E0711-02	MW-7 (7-9)	Encore Sampler
13E0711-03	MW-9 (0-2)	Encore Sampler
13E0711-04	MW-9 (6-8)	Encore Sampler
13E0711-05	MW-6 (0-2)	Encore Sampler
13E0711-06	MW-6 (9-11)	Encore Sampler
13E0711-07	MW-8 (0.5-2.5)	Encore Sampler
13E0711-08	MW-8 (7.5-9.5)	Encore Sampler
13E0711-09	TB-052113	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C

Notes and Definitions

U	Analyte included in the analysis, but not detected
S-BN	Base/Neutral surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two base/neutral surrogates.
S-04	The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL); therefore, the result is an estimated concentration.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
D	The result reported is from a dilution of the sample due to levels of target compounds found
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants. Data users should consider anything <10x the blank value as artifact.

ND	Analyte NOT DETECTED at the stated Reporting Limit (RL) or above.
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
MDL	METHOD DETECTION LIMIT - the minimum concentration that can be measured and reported with a 99% confidence that the concentration is greater than zero. If requested or required, a value reported below the RL and above the MDL is considered estimated and is noted with a "J" flag.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

High Bias — High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

Non-Dir. — Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two.
For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the MDL, with values between the MDL and the RL being "J" flagged as estimated results.

YORK ANALYTICAL LABORATORIES
120 RESEARCH DR.
STRATFORD, CT 06615
(203) 325-1371
FAX (203) 357-0166

Field Chain-of-Custody Record

NOTE: York's Std. Terms & Conditions are listed on the back side of this document. This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions.

York Project No. 13E0711

YOUR Information

Company: Langan Engineering
Address: 360 W 31st St 8th Fl
NY, NY 10001
Phone No. (212)479-5400
Contact Person: Brandon Nathe
E-Mail Address: BNathe@langan.com

Report To:

Company: SAME
Address:
Phone No.
Attention: Paul McMahon
E-Mail Address: PMcMahon@langan.com

Invoice To:

Company: SAME
Address:
Phone No.
Attention:
E-Mail Address:

YOUR Project ID

170246501

Purchase Order No.

Samples from: CT ___ NY ✓ NJ ___

Turn-Around Time

- RUSH - Same Day ☐
- RUSH - Next Day ☐
- RUSH - Two Day ☐
- RUSH - Three Day ☐
- RUSH - Four Day ✓
- Standard(5-7 Days) ☐

Report Type

- Summary Report X
- Summary w/ QA Summary
- CT RCP Package
- CTRCP DQA/DUE Pkg
- NY ASP A Package
- NY ASP B Package X
- NJDEP Red. Deliv.

Electronic Data Deliverables (EDD)

- Simple Excel
- NYSDEC EQuIS X
- EQuIS (std)
- EZ-EDD (EQuIS)
- NJDEP SRP HazSite EDD
- GIS/KEY (std)
- Other

York Regulatory Comparison Excel Spreadsheet X
Compare to the following Regs. (please fill in):
Part 375 Unrestricted

Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

Paul McMahon
Samples Collected/Authorized By (Signature)
Paul McMahon
Name (printed)

Matrix Codes
S - soil
Other - specify(oil, etc.)
WW - wastewater
GW - groundwater
DW - drinking water
Air-A - ambient air
Air-SV - soil vapor

Volatiles		Semi-Vols.	Pest/PCB/Herb	Metals	Misc. Org.	Full Lists	Misc.
8260 full	TICs	8270 or 625	8082PCB	RCRA8	TPH GRO	Pri.Poll.	Corrosivity
624	Site Spec.	STARS list	8081Pest	PP13 list	TPH DRO	TCL Organics	Reactivity
STARS list	Nassau Co.	BN Only	8151Herb	TAL	CT ETPH	TAL Met/CN	Ignitability
BTEX	Suffolk Co.	Acids Only	CT RCP	CT15 list	NY 310-13	Full TCLP	Flash Point
MTBE	Ketones	PAH list	App. IX	TAGM list	TPH 1664	Full App. IX	Sieve Anal.
TCL list	Oxygenates	TAGM list	Site Spec.	NJDEP list	Air TO14A	Part 360-Routine	Heterotrophs
TAGM list	TCLP list	CT RCP list	SPLP or TCLP	Total	Air TO15	Part 360-Baseline	TOX
CT RCP list	524.2	TCL list	TCLP Pest	Dissolved	Air STARS	Part 360-Expanded No Dioxins/Furans	BTU/lb.
Arom. only	502.2	NJDEP list	TCLP Herb	SPLP or TCLP	Air VPH	Part 360-Expanded Full List	Aquatic Tox.
Halog.only	NJDEP list	App. IX	Chlordane	Indiv. Metals	Air TICs	NYCDEP Sewer	TOC
App.IX list	SPLP or TCLP	TCLP BNA	608 Pest	LIST Below	Methane	NYSDEC Sewer	Asbestos
8021B list		SPLP or TCLP	608 PCB		Helium	TAGM	Silica

Sample Identification	Date/Time Sampled	Sample Matrix	Choose Analyses Needed from the Menu Above and Enter Below	Container Description(s)
MW-7 (1-5)	5/20/13 13:25	S	VOC/SVOC/Metals/PCB/Pest (see circled)	1oz, 3 encore, 1 VOA vial
MW-7 (7-9)	5/20/13 13:35		VOC/SVOC/Metals/PCB	
MW-9 (0-2)	5/20/13 15:35		VOC/SVOC/Metals/PCB/Pest	
MW-9 (6-8)	5/20/13 15:45		VOC/SVOC/Metals/PCB	
MW-6 (0-2)	5/20/13 15:00		VOC/SVOC/Metals/PCB/Pest	
MW-6 (9-11)	5/20/13 15:18		VOC/SVOC/Metals/PCB	
MW-8 (0.5-2.5)	5/20/13 14:00		VOC/SVOC/Metals/PCB/Pest	
MW-8 (7.5-9.5)	5/20/13 14:40		VOC/SVOC/Metals/PCB	
TB-052113	5/21/13	DI Water	VOC	1 VOA

Comments

Preservation Check those Applicable
Special Instructions
Field Filtered ☐
Lab to Filter ☐

4°C ___ Frozen ___ HCl ___ MeOH ___ HNO_3 ___ H_2SO_4 ___ NaOH ___
ZnAc ___ Ascorbic Acid ___ Other ___

Paul McMahon	5/20/13 8:00	JKBaker	5-21-13 8AM
Samples Relinquished By	Date/Time	Samples Received By	Date/Time
		Pgrace	5-21-13 1645
Samples Relinquished By	Date/Time	Samples Received in LAB by	Date/Time

Temperature on Receipt 3.6 °C

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Report Date: 05/29/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0744

Report Date: 05/29/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0744

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on May 22, 2013 and listed below. The project was identified as your project: **170246501**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the attachment to this report, and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
13E0744-01	MW-5 (0-2)	Soil	05/21/2013	05/22/2013
13E0744-02	MW-5 (6-8)	Soil	05/21/2013	05/22/2013
13E0744-03	LG-20 (0-2)	Soil	05/21/2013	05/22/2013
13E0744-04	LG-20 (22-24)	Soil	05/21/2013	05/22/2013
13E0744-05	LG-21 (0-2)	Soil	05/21/2013	05/22/2013
13E0744-06	LG-21 (20-22)	Soil	05/21/2013	05/22/2013
13E0744-07	MW-10 (1-3)	Soil	05/21/2013	05/22/2013
13E0744-08	MW-10 (32-34)	Soil	05/21/2013	05/22/2013
13E0744-09	LG-19 (0-2)	Soil	05/21/2013	05/22/2013
13E0744-10	LG-19 (26-28)	Soil	05/21/2013	05/22/2013
13E0744-11	DUP-1 (052113)	Soil	05/21/2013	05/22/2013
13E0744-12	TB_052113	Water	05/21/2013	05/22/2013

General Notes for York Project (SDG) No.: 13E0744

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation, unless otherwise noted.
6. All analyses conducted met method or Laboratory SOP requirements. See the Qualifiers and/or Narrative sections for further information.
7. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
8. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.

Approved By: 

Date: 05/29/2013

Benjamin Gulizia
Laboratory Director

YORK

Sample Information

Client Sample ID: MW-5 (0-2)

York Sample ID: 13E0744-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:25 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.054	0.11	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
67-64-1	Acetone	**0.0029**	J, B	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS

Sample Information

Client Sample ID: MW-5 (0-2)

York Sample ID: 13E0744-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:25 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-09-2	Methylene chloride	**0.0063**	J	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0054	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS

Sample Information

Client Sample ID: MW-5 (0-2) **York Sample ID:** 13E0744-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:25 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0081	0.016	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0027	0.0054	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:02	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*100 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*110 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*100 %*	*84-117*

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0706	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0936	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.112	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.106	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.0729	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.0772	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.163	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0648	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.195	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.195	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.108	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0940	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.131	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0507	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0671	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0995	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0687	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.135	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.105	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0644	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.114	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.0897	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0784	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0909	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR

Sample Information

Client Sample ID: MW-5 (0-2) **York Sample ID:** 13E0744-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:25 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0792	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.128	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.120	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0616	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.102	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.159	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.122	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.137	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0870	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.246	0.390	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.170	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.164	0.390	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.100	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0862	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.195	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.114	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0936	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.115	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0659	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.145	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0558	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0889	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0671	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.150	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0741	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0847	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0480	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.194	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0807	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0573	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0733	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0531	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR

Sample Information

Client Sample ID: MW-5 (0-2) **York Sample ID:** 13E0744-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:25 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0651	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0800	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0882	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.147	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.102	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0843	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.0796	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.137	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0706	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.151	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0991	0.195	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 17:59	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*69.4 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*52.2 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*55.5 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*58.7 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*56.6 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*55.6 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.0977	0.0977	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.00965	0.00965	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW

Sample Information

Client Sample ID: MW-5 (0-2) **York Sample ID:** 13E0744-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:25 am	05/22/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.00772	0.00772	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00193	0.00193	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:47	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0199	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0199	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0199	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0199	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0199	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0199	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0199	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.00796	0.0199	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 11:26	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*83.3 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*74.7 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**7490**		mg/kg dry	1.19	2.34	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.257	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-38-2	Arsenic	**2.33**		mg/kg dry	0.398	1.17	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-39-3	Barium	**71.7**		mg/kg dry	0.152	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.117	0.117	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.117	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-70-2	Calcium	**22100**		mg/kg dry	0.047	5.85	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-47-3	Chromium	**20.4**		mg/kg dry	0.140	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-48-4	Cobalt	**7.35**		mg/kg dry	0.094	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-50-8	Copper	**16.7**		mg/kg dry	0.140	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7439-89-6	Iron	**13900**		mg/kg dry	0.761	2.34	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW

Sample Information

Client Sample ID: MW-5 (0-2) **York Sample ID:** 13E0744-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:25 am	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-92-1	Lead	**4.56**		mg/kg dry	0.199	0.351	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7439-95-4	Magnesium	**13300**		mg/kg dry	0.527	5.85	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7439-96-5	Manganese	**340**		mg/kg dry	0.129	1.17	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-02-0	Nickel	**17.4**		mg/kg dry	0.152	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-09-7	Potassium	**3170**		mg/kg dry	3.96	11.7	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.585	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.117	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-23-5	Sodium	**275**	B	mg/kg dry	6.17	11.7	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.374	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-62-2	Vanadium	**23.8**		mg/kg dry	0.129	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW
7440-66-6	Zinc	**37.0**		mg/kg dry	0.105	0.585	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:21	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0386	0.0386	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**85.4**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: MW-5 (6-8) **York Sample ID:** 13E0744-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:35 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS

Sample Information

Client Sample ID: MW-5 (6-8) **York Sample ID:** 13E0744-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:35 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.053	0.11	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
67-64-1	Acetone	**0.0040**	J, B	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS

Sample Information

Client Sample ID: MW-5 (6-8) **York Sample ID:** 13E0744-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:35 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-09-2	Methylene chloride	**0.0054**	J	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0053	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0080	0.016	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 14:43	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*108 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*113 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*99.0 %*	*84-117*

Sample Information

Client Sample ID: MW-5 (6-8) **York Sample ID:** 13E0744-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:35 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0670	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0889	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.106	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.101	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.0693	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.0733	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.155	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0615	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.185	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.185	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.102	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0892	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.125	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0481	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0637	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0944	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0652	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.128	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.100	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0611	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.109	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.0852	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0744	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0863	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0752	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.121	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.114	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0585	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.0970	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.151	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.116	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.130	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR

Sample Information

Client Sample ID: MW-5 (6-8) **York Sample ID:** 13E0744-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:35 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0826	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.161	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.233	0.370	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.156	0.370	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0952	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0818	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.185	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.109	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0889	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.109	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0626	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.138	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0530	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0844	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0637	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.142	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0704	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0804	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0456	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.184	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0767	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0544	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0696	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0504	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0618	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0759	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0837	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.140	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.0967	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0800	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.0755	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.130	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR

Sample Information

Client Sample ID: MW-5 (6-8) **York Sample ID:** 13E0744-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:35 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0670	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.144	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0941	0.185	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 18:29	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*55.8 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*50.3 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*49.5 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*51.1 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*52.2 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*53.3 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0189	0.0189	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 11:56	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*56.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*55.7 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**12300**		mg/kg dry	1.13	2.22	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.244	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-38-2	Arsenic	**2.95**		mg/kg dry	0.378	1.11	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-39-3	Barium	**69.0**		mg/kg dry	0.144	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.111	0.111	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.111	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-70-2	Calcium	**3100**		mg/kg dry	0.044	5.55	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW

Sample Information

Client Sample ID: MW-5 (6-8) **York Sample ID:** 13E0744-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:35 am	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**23.4**		mg/kg dry	0.133	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-48-4	Cobalt	**9.30**		mg/kg dry	0.089	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-50-8	Copper	**16.5**		mg/kg dry	0.133	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7439-89-6	Iron	**22700**	E	mg/kg dry	0.722	2.22	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7439-92-1	Lead	**3.06**		mg/kg dry	0.189	0.333	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7439-95-4	Magnesium	**7840**		mg/kg dry	0.500	5.55	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7439-96-5	Manganese	**332**		mg/kg dry	0.122	1.11	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-02-0	Nickel	**15.7**		mg/kg dry	0.144	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-09-7	Potassium	**6600**		mg/kg dry	3.76	11.1	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7782-49-2	Selenium	**0.753**		mg/kg dry	0.555	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.111	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-23-5	Sodium	**258**	B	mg/kg dry	5.85	11.1	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.356	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-62-2	Vanadium	**41.2**		mg/kg dry	0.122	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW
7440-66-6	Zinc	**42.4**		mg/kg dry	0.100	0.555	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:38	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0367	0.0367	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**90.0**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.053	0.11	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-09-2	Methylene chloride	**0.0058**	J	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0027	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0053	0.011	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0080	0.016	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0027	0.0053	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 15:23	SS

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*113 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*126 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*104 %*		*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0663	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0879	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.105	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.100	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.0685	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.0725	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.153	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0608	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.183	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.183	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.101	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0883	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.123	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0476	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0630	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0934	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0645	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.126	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.0989	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0604	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.107	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.0843	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0736	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0854	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0744	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.120	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.113	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0579	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.0960	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.149	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.115	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.128	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0817	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.160	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.231	0.366	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.154	0.366	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0941	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0810	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.183	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.107	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0879	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.108	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0619	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.136	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0524	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0835	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0630	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.141	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0696	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0795	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0451	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.182	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0758	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0538	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0689	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0498	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0612	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0751	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0828	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.138	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.0956	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0791	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.0747	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.129	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0663	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.142	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0930	0.183	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:00	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*62.9 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*53.7 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*52.2 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*54.4 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*53.2 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*50.4 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.0918	0.0918	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.00907	0.00907	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.00725	0.00725	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00181	0.00181	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:02	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0187	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0187	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0187	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0187	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0187	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0187	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0187	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.00747	0.0187	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 12:25	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*45.9 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*40.9 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**14800**		mg/kg dry	1.12	2.20	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.242	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-38-2	Arsenic	**3.14**		mg/kg dry	0.374	1.10	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-39-3	Barium	**81.6**		mg/kg dry	0.143	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.110	0.110	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.110	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-70-2	Calcium	**1120**		mg/kg dry	0.044	5.49	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-47-3	Chromium	**31.7**		mg/kg dry	0.132	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-48-4	Cobalt	**9.83**		mg/kg dry	0.088	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-50-8	Copper	**22.1**		mg/kg dry	0.132	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7439-89-6	Iron	**20100**		mg/kg dry	0.714	2.20	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7439-92-1	Lead	**6.44**		mg/kg dry	0.187	0.330	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7439-95-4	Magnesium	**4670**		mg/kg dry	0.495	5.49	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7439-96-5	Manganese	**417**		mg/kg dry	0.121	1.10	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW

Sample Information

Client Sample ID: LG-20 (0-2) **York Sample ID:** 13E0744-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:44 am	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-02-0	Nickel	**25.1**		mg/kg dry	0.143	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-09-7	Potassium	**1720**		mg/kg dry	3.71	11.0	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.549	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.110	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-23-5	Sodium	**151**	B	mg/kg dry	5.79	11.0	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.352	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-62-2	Vanadium	**33.5**		mg/kg dry	0.121	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW
7440-66-6	Zinc	**43.1**		mg/kg dry	0.099	0.549	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:42	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0363	0.0363	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**91.0**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: LG-20 (22-24) **York Sample ID:** 13E0744-04

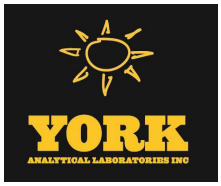
York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 12:01 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS



Sample Information

Client Sample ID: **LG-20 (22-24)** **York Sample ID:** **13E0744-04**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 12:01 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.052	0.10	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
67-64-1	Acetone	**0.0042**	J, B	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS

Sample Information

Client Sample ID: LG-20 (22-24) **York Sample ID:** 13E0744-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 12:01 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-09-2	Methylene chloride	**0.0058**	J	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0052	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0078	0.016	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:04	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*112 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*114 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*102 %*	*84-117*

Sample Information

Client Sample ID: LG-20 (22-24) **York Sample ID:** 13E0744-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 12:01 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0699	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0927	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.110	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
120-12-7	Anthracene	**0.110**	J	mg/kg dry	0.105	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
56-55-3	Benzo(a)anthracene	**0.159**	J	mg/kg dry	0.0722	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
50-32-8	Benzo(a)pyrene	**0.158**	J	mg/kg dry	0.0765	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.162	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
191-24-2	Benzo(g,h,i)perylene	**0.0857**	J	mg/kg dry	0.0641	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.107	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0931	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.130	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0502	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0664	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0985	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0680	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.133	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.104	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0637	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
218-01-9	Chrysene	**0.155**	J	mg/kg dry	0.0888	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0776	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0900	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0784	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.126	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.119	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0610	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.158	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.121	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.135	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR

Sample Information

Client Sample ID: LG-20 (22-24) **York Sample ID:** 13E0744-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 12:01 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0861	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.243	0.386	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.168	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.162	0.386	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0993	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0854	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
206-44-0	Fluoranthene	**0.390**		mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0927	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.114	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0653	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.144	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0552	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0881	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0664	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.148	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0734	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0838	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0475	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.192	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0800	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0568	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0726	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0525	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0645	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0792	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0873	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.146	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
85-01-8	Phenanthrene	**0.390**		mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0834	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
129-00-0	Pyrene	**0.244**		mg/kg dry	0.0788	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.136	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR

Sample Information

Client Sample ID: LG-20 (22-24) **York Sample ID:** 13E0744-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 12:01 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0699	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.150	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0981	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 19:30	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*72.8 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*53.4 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*56.5 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*58.6 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*61.5 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*50.3 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 12:54	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*47.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*48.8 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**12600**		mg/kg dry	1.18	2.32	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.255	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-38-2	Arsenic	**5.72**		mg/kg dry	0.394	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-39-3	Barium	**102**		mg/kg dry	0.151	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.116	0.116	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.116	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-70-2	Calcium	**1700**		mg/kg dry	0.046	5.79	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW

Sample Information

Client Sample ID: LG-20 (22-24) **York Sample ID:** 13E0744-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 12:01 pm	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**25.9**		mg/kg dry	0.139	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-48-4	Cobalt	**11.6**		mg/kg dry	0.093	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-50-8	Copper	**26.8**		mg/kg dry	0.139	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7439-89-6	Iron	**17500**		mg/kg dry	0.753	2.32	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7439-92-1	Lead	**22.5**		mg/kg dry	0.197	0.348	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7439-95-4	Magnesium	**4120**		mg/kg dry	0.521	5.79	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7439-96-5	Manganese	**223**		mg/kg dry	0.127	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-02-0	Nickel	**21.5**		mg/kg dry	0.151	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-09-7	Potassium	**1220**		mg/kg dry	3.92	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7782-49-2	Selenium	**0.872**		mg/kg dry	0.579	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.116	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-23-5	Sodium	**249**	B	mg/kg dry	6.11	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.371	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-62-2	Vanadium	**29.4**		mg/kg dry	0.127	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW
7440-66-6	Zinc	**57.5**		mg/kg dry	0.104	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:47	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0382	0.0382	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**86.3**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

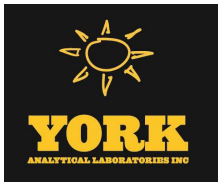
York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS



Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.050	0.10	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
67-64-1	Acetone	ND	U	mg/kg dry	0.0025	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS

Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-09-2	Methylene chloride	**0.0046**	J	mg/kg dry	0.0025	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0025	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0050	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0075	0.015	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0025	0.0050	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 16:45	SS

Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*101 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*118 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*103 %*		*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	**0.151**	J	mg/kg dry	0.0697	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0925	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.110	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
120-12-7	Anthracene	**0.296**		mg/kg dry	0.105	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
56-55-3	Benzo(a)anthracene	**0.577**		mg/kg dry	0.0721	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
50-32-8	Benzo(a)pyrene	**0.431**		mg/kg dry	0.0763	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
205-99-2	Benzo(b)fluoranthene	**0.420**		mg/kg dry	0.161	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
191-24-2	Benzo(g,h,i)perylene	**0.234**		mg/kg dry	0.0640	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
207-08-9	Benzo(k)fluoranthene	**0.406**		mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.106	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0929	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.130	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0501	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0663	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0983	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0678	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.133	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.104	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0636	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
218-01-9	Chrysene	**0.505**		mg/kg dry	0.0886	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0774	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0898	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0782	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.126	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.119	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR

Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0609	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.157	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.121	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.135	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0859	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.168	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.243	0.385	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.162	0.385	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0990	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0852	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
206-44-0	Fluoranthene	**1.04**		mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
86-73-7	Fluorene	**0.129**	J	mg/kg dry	0.0925	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.114	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0651	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.143	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0551	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
193-39-5	Indeno(1,2,3-cd)pyrene	**0.267**		mg/kg dry	0.0879	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0663	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.148	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0732	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0836	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0474	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.191	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0798	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0566	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0724	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0524	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0643	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0790	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0871	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR

Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.145	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
85-01-8	Phenanthrene	**0.847**		mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0832	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
129-00-0	Pyrene	**0.707**		mg/kg dry	0.0786	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.135	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0697	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.149	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0979	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:01	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*64.7 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*51.4 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*50.5 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*54.1 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*54.3 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*46.8 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.0965	0.0965	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.00954	0.00954	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.00763	0.00763	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW

Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
309-00-2	Aldrin	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:17	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.00786	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 13:23	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*41.3 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*30.1 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**15100**		mg/kg dry	1.18	2.31	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.254	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-38-2	Arsenic	**4.30**		mg/kg dry	0.393	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-39-3	Barium	**81.5**		mg/kg dry	0.150	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.116	0.116	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.116	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-70-2	Calcium	**1590**		mg/kg dry	0.046	5.78	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-47-3	Chromium	**28.0**		mg/kg dry	0.139	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-48-4	Cobalt	**9.40**		mg/kg dry	0.092	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-50-8	Copper	**17.0**		mg/kg dry	0.139	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7439-89-6	Iron	**20200**		mg/kg dry	0.751	2.31	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7439-92-1	Lead	**51.7**		mg/kg dry	0.197	0.347	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7439-95-4	Magnesium	**5370**		mg/kg dry	0.520	5.78	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7439-96-5	Manganese	**380**		mg/kg dry	0.127	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-02-0	Nickel	**23.2**		mg/kg dry	0.150	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-09-7	Potassium	**1010**		mg/kg dry	3.91	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW

Sample Information

Client Sample ID: LG-21 (0-2) **York Sample ID:** 13E0744-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 10:55 am	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7782-49-2	Selenium	ND	U	mg/kg dry	0.578	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.116	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-23-5	Sodium	**144**	B	mg/kg dry	6.09	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.370	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-62-2	Vanadium	**31.6**		mg/kg dry	0.127	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW
7440-66-6	Zinc	**57.6**		mg/kg dry	0.104	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:51	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0381	0.0381	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**86.5**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: LG-21 (20-22) **York Sample ID:** 13E0744-06

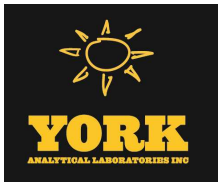
York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:25 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS



Sample Information

Client Sample ID: LG-21 (20-22) **York Sample ID:** 13E0744-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:25 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.052	0.10	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
78-93-3	2-Butanone	**0.0034**	J	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
67-64-1	Acetone	**0.023**	B	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS

Sample Information

Client Sample ID: LG-21 (20-22) **York Sample ID:** 13E0744-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:25 am	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-09-2	Methylene chloride	**0.0059**	J	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0026	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0052	0.010	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0078	0.016	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0026	0.0052	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 17:25	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*108 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*115 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*101 %*	*84-117*

Sample Information

Client Sample ID: LG-21 (20-22) **York Sample ID:** 13E0744-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:25 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0692	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0918	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.109	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.104	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
56-55-3	Benzo(a)anthracene	**0.0777**	J	mg/kg dry	0.0715	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
50-32-8	Benzo(a)pyrene	**0.120**	J	mg/kg dry	0.0757	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.160	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
191-24-2	Benzo(g,h,i)perylene	**0.0738**	J	mg/kg dry	0.0635	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.191	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.191	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.106	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0922	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.129	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0497	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0658	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0975	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0673	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.132	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.103	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0631	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.112	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.0880	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0769	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0891	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0777	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.125	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.118	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0604	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.100	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.156	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.120	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.134	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR

Sample Information

Client Sample ID: LG-21 (20-22) **York Sample ID:** 13E0744-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:25 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0853	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.241	0.383	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.167	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.161	0.383	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0983	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0845	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.191	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.112	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0918	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.113	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0646	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.142	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0547	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0872	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0658	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.147	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0727	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0830	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0471	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.190	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0792	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0562	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0719	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0520	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0639	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0784	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0865	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.144	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.0998	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0826	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
129-00-0	Pyrene	**0.0956**	J	mg/kg dry	0.0780	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.134	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR

Sample Information

Client Sample ID: LG-21 (20-22) **York Sample ID:** 13E0744-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:25 am	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0692	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.148	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0972	0.191	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 20:31	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*79.9 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*60.5 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*61.3 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*62.8 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*64.7 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*55.4 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0195	0.0195	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 13:53	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*53.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*57.2 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**14200**		mg/kg dry	1.17	2.30	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.252	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-38-2	Arsenic	**2.80**		mg/kg dry	0.390	1.15	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-39-3	Barium	**140**		mg/kg dry	0.149	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.115	0.115	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.115	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-70-2	Calcium	**2300**		mg/kg dry	0.046	5.74	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW

Sample Information

Client Sample ID: LG-21 (20-22) **York Sample ID:** 13E0744-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 11:25 am	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**32.9**		mg/kg dry	0.138	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-48-4	Cobalt	**12.2**		mg/kg dry	0.092	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-50-8	Copper	**35.0**		mg/kg dry	0.138	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7439-89-6	Iron	**20500**		mg/kg dry	0.746	2.30	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7439-92-1	Lead	**8.18**		mg/kg dry	0.195	0.344	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7439-95-4	Magnesium	**7080**		mg/kg dry	0.516	5.74	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7439-96-5	Manganese	**274**		mg/kg dry	0.126	1.15	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-02-0	Nickel	**25.4**		mg/kg dry	0.149	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-09-7	Potassium	**2600**		mg/kg dry	3.88	11.5	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7782-49-2	Selenium	**1.07**		mg/kg dry	0.574	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.115	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-23-5	Sodium	**274**	B	mg/kg dry	6.05	11.5	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.367	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-62-2	Vanadium	**51.9**		mg/kg dry	0.126	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW
7440-66-6	Zinc	**59.9**		mg/kg dry	0.103	0.574	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 20:56	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0379	0.0379	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**87.1**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.049	0.099	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
67-64-1	Acetone	**0.0033**	J, B	mg/kg dry	0.0025	0.0099	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-09-2	Methylene chloride	**0.0050**	J	mg/kg dry	0.0025	0.0099	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0025	0.0099	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0049	0.0099	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0074	0.015	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0025	0.0049	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:06	SS

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*102 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*115 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*102 %*		*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0674	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0894	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.107	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.102	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
56-55-3	Benzo(a)anthracene	**0.230**		mg/kg dry	0.0697	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
50-32-8	Benzo(a)pyrene	**0.238**		mg/kg dry	0.0738	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
205-99-2	Benzo(b)fluoranthene	**0.200**		mg/kg dry	0.156	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
191-24-2	Benzo(g,h,i)perylene	**0.159**	J	mg/kg dry	0.0619	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.186	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
207-08-9	Benzo(k)fluoranthene	**0.249**		mg/kg dry	0.186	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.103	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0898	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.126	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0484	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0641	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0950	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0656	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.129	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.101	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0615	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.109	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
218-01-9	Chrysene	**0.234**		mg/kg dry	0.0857	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
53-70-3	Dibenzo(a,h)anthracene	**0.0909**	J	mg/kg dry	0.0749	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0868	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0756	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.122	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.115	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0589	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.0976	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.152	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.117	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.130	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0831	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.162	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.235	0.373	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.157	0.373	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0958	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0824	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.186	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
206-44-0	Fluoranthene	**0.404**		mg/kg dry	0.109	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0894	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.110	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0630	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.139	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0533	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
193-39-5	Indeno(1,2,3-cd)pyrene	**0.167**	J	mg/kg dry	0.0850	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0641	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.143	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0708	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0809	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0458	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.185	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0771	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0548	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0701	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0507	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0622	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0764	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0842	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.140	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
85-01-8	Phenanthrene	**0.144**	J	mg/kg dry	0.0973	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0805	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
129-00-0	Pyrene	**0.280**		mg/kg dry	0.0760	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.131	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0674	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.145	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0946	0.186	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:02	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*76.5 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*57.3 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*52.7 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*60.0 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*56.6 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*53.3 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.0933	0.0933	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.00922	0.00922	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.00738	0.00738	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00184	0.00184	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:32	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.00760	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:22	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*53.6 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*37.1 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**12100**		mg/kg dry	1.14	2.24	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.246	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-38-2	Arsenic	**2.92**		mg/kg dry	0.380	1.12	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-39-3	Barium	**72.4**		mg/kg dry	0.145	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.112	0.112	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.112	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-70-2	Calcium	**5190**		mg/kg dry	0.045	5.59	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-47-3	Chromium	**27.4**		mg/kg dry	0.134	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-48-4	Cobalt	**10.4**		mg/kg dry	0.089	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-50-8	Copper	**30.7**		mg/kg dry	0.134	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7439-89-6	Iron	**18700**		mg/kg dry	0.727	2.24	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7439-92-1	Lead	**35.8**		mg/kg dry	0.190	0.335	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7439-95-4	Magnesium	**7530**		mg/kg dry	0.503	5.59	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7439-96-5	Manganese	**307**		mg/kg dry	0.123	1.12	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-02-0	Nickel	**30.7**		mg/kg dry	0.145	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW

Sample Information

Client Sample ID: MW-10 (1-3) **York Sample ID:** 13E0744-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:33 pm	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-09-7	Potassium	**2000**		mg/kg dry	3.78	11.2	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.559	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.112	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-23-5	Sodium	**195**	B	mg/kg dry	5.89	11.2	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.358	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-62-2	Vanadium	**34.1**		mg/kg dry	0.123	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW
7440-66-6	Zinc	**77.4**		mg/kg dry	0.101	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:01	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0369	0.0369	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**89.5**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: MW-10 (32-34) **York Sample ID:** 13E0744-08

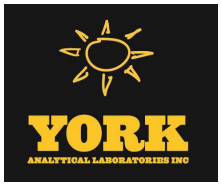
York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:55 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS



Sample Information

Client Sample ID: **MW-10 (32-34)** **York Sample ID:** **13E0744-08**

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:55 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.062	0.12	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
67-64-1	Acetone	**0.0044**	J, B	mg/kg dry	0.0031	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS

Sample Information

Client Sample ID: MW-10 (32-34) **York Sample ID:** 13E0744-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:55 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-09-2	Methylene chloride	**0.0088**	J	mg/kg dry	0.0031	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0031	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0062	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0092	0.018	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0031	0.0062	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 18:47	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*104 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*109 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*99.8 %*	*84-117*

Sample Information

Client Sample ID: MW-10 (32-34) **York Sample ID:** 13E0744-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:55 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0698	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0925	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.110	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.105	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.0721	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.0763	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.162	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0640	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.106	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0929	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.130	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0501	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0663	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0983	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0679	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.133	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.104	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0636	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.0887	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0775	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0898	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0783	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.126	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.119	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0609	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.157	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.121	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.135	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR

Sample Information

Client Sample ID: MW-10 (32-34) **York Sample ID:** 13E0744-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:55 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0860	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.243	0.386	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.168	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.162	0.386	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0991	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0852	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0925	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.114	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0652	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.143	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0551	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0879	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0663	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.148	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0733	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0837	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0474	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.192	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0798	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0567	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0725	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0524	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0644	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0790	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0871	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.145	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0833	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.0787	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.135	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR

Sample Information

Client Sample ID: MW-10 (32-34) **York Sample ID:** 13E0744-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:55 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0698	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.150	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0979	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 21:32	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*74.1 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*57.7 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*58.6 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*63.4 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*61.2 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*55.8 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0197	0.0197	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 14:51	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*70.0 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*67.7 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**4770**		mg/kg dry	1.18	2.31	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.254	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-38-2	Arsenic	**1.33**		mg/kg dry	0.393	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-39-3	Barium	**41.1**		mg/kg dry	0.150	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.116	0.116	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.116	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-70-2	Calcium	**1200**		mg/kg dry	0.046	5.78	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW

Sample Information

Client Sample ID: MW-10 (32-34) **York Sample ID:** 13E0744-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:55 pm	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**11.5**		mg/kg dry	0.139	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-48-4	Cobalt	**5.36**		mg/kg dry	0.093	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-50-8	Copper	**10.9**		mg/kg dry	0.139	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7439-89-6	Iron	**10700**		mg/kg dry	0.752	2.31	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7439-92-1	Lead	**3.85**		mg/kg dry	0.197	0.347	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7439-95-4	Magnesium	**2170**		mg/kg dry	0.520	5.78	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7439-96-5	Manganese	**188**		mg/kg dry	0.127	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-02-0	Nickel	**13.6**		mg/kg dry	0.150	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-09-7	Potassium	**1150**		mg/kg dry	3.91	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7782-49-2	Selenium	**0.780**		mg/kg dry	0.578	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.116	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-23-5	Sodium	**320**	B	mg/kg dry	6.10	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.370	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-62-2	Vanadium	**15.0**		mg/kg dry	0.127	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW
7440-66-6	Zinc	**22.8**		mg/kg dry	0.104	0.578	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:05	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0382	0.0382	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**86.5**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.075	0.15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
67-64-1	Acetone	**0.0093**	J	mg/kg dry	0.0037	0.015	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-09-2	Methylene chloride	**0.0086**	J, B	mg/kg dry	0.0037	0.015	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0037	0.015	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0075	0.015	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.011	0.022	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0037	0.0075	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:49	SS

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*106 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*118 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*110 %*		*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.338	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.448	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.533	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.509	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
56-55-3	Benzo(a)anthracene	**0.972**	D	mg/kg dry	0.349	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
50-32-8	Benzo(a)pyrene	**1.04**	D	mg/kg dry	0.369	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
205-99-2	Benzo(b)fluoranthene	**0.858**	J, D	mg/kg dry	0.781	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
191-24-2	Benzo(g,h,i)perylene	**0.569**	J, D	mg/kg dry	0.310	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.932	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
207-08-9	Benzo(k)fluoranthene	**1.05**	D	mg/kg dry	0.932	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.515	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.449	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.628	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.242	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.321	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.476	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.328	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.643	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.503	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.308	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.546	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
218-01-9	Chrysene	**0.988**	D	mg/kg dry	0.429	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.375	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.434	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.379	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.610	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.574	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.295	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.489	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.761	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.586	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.653	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.416	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.813	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	1.17	1.86	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.783	1.86	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.479	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.412	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.932	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
206-44-0	Fluoranthene	**1.55**	D	mg/kg dry	0.546	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.448	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.550	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.315	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.694	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.267	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
193-39-5	Indeno(1,2,3-cd)pyrene	**0.597**	J, D	mg/kg dry	0.425	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.321	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.716	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.354	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.405	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.229	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.927	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.386	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.274	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.351	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.254	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.311	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.382	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.421	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.703	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
85-01-8	Phenanthrene	**0.600**	J, D	mg/kg dry	0.487	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.403	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
129-00-0	Pyrene	**1.22**	D	mg/kg dry	0.380	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.655	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.338	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.724	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.474	0.932	5	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:03	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*79.1 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*74.6 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*56.3 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*63.0 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*67.7 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*65.7 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.0934	0.0934	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.00923	0.00923	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.00738	0.00738	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00185	0.00185	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 14:47	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0190	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.00761	0.0190	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:20	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*67.9 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*56.3 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**11100**		mg/kg dry	1.14	2.24	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.246	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-38-2	Arsenic	**3.07**		mg/kg dry	0.380	1.12	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-39-3	Barium	**110**		mg/kg dry	0.145	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.112	0.112	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.112	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-70-2	Calcium	**9460**		mg/kg dry	0.045	5.59	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-47-3	Chromium	**26.6**		mg/kg dry	0.134	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-48-4	Cobalt	**9.20**		mg/kg dry	0.090	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-50-8	Copper	**35.4**		mg/kg dry	0.134	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7439-89-6	Iron	**18200**		mg/kg dry	0.727	2.24	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7439-92-1	Lead	**58.7**		mg/kg dry	0.190	0.336	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7439-95-4	Magnesium	**6320**		mg/kg dry	0.503	5.59	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7439-96-5	Manganese	**292**		mg/kg dry	0.123	1.12	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-02-0	Nickel	**23.6**		mg/kg dry	0.145	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW

Sample Information

Client Sample ID: LG-19 (0-2) **York Sample ID:** 13E0744-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:06 pm	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-09-7	Potassium	**2560**		mg/kg dry	3.78	11.2	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7782-49-2	Selenium	ND	U	mg/kg dry	0.559	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.112	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-23-5	Sodium	**203**	B	mg/kg dry	5.90	11.2	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.358	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-62-2	Vanadium	**32.6**		mg/kg dry	0.123	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW
7440-66-6	Zinc	**90.0**		mg/kg dry	0.101	0.559	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:10	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0369	0.0369	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**89.4**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: LG-19 (26-28) **York Sample ID:** 13E0744-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:20 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS

Sample Information

Client Sample ID: LG-19 (26-28) **York Sample ID:** 13E0744-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:20 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.059	0.12	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
67-64-1	Acetone	**0.0041**	J, B	mg/kg dry	0.0029	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS

Sample Information

Client Sample ID: LG-19 (26-28) **York Sample ID:** 13E0744-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:20 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-09-2	Methylene chloride	**0.0059**	J	mg/kg dry	0.0029	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0029	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0059	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0088	0.018	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0029	0.0059	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:10	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*113 %*	*73-130*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*107 %*	*72-127*
2037-26-5	*Surrogate: Toluene-d8*	*95.7 %*	*84-117*

Sample Information

Client Sample ID: LG-19 (26-28) **York Sample ID:** 13E0744-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:20 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0682	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0905	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.108	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.103	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
56-55-3	Benzo(a)anthracene	ND	U	mg/kg dry	0.0705	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
50-32-8	Benzo(a)pyrene	ND	U	mg/kg dry	0.0746	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.158	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0626	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.188	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.188	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.104	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0909	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.127	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0490	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0648	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0961	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0663	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.130	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.102	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0622	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.110	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
218-01-9	Chrysene	ND	U	mg/kg dry	0.0867	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0758	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0878	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0765	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.123	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.116	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0596	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.0988	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.154	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.118	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.132	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR

Sample Information

Client Sample ID: LG-19 (26-28) **York Sample ID:** 13E0744-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:20 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0841	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.237	0.377	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.164	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.158	0.377	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0969	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0833	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.188	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
206-44-0	Fluoranthene	ND	U	mg/kg dry	0.110	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0905	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.111	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0637	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.140	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0539	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0860	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0648	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.145	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0716	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0818	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0464	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.187	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0780	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0554	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0709	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0513	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0630	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0773	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0852	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.142	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
85-01-8	Phenanthrene	ND	U	mg/kg dry	0.0984	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0814	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
129-00-0	Pyrene	ND	U	mg/kg dry	0.0769	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.132	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR

Sample Information

Client Sample ID: LG-19 (26-28) **York Sample ID:** 13E0744-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:20 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0682	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.146	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0958	0.188	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 22:33	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*68.8 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*50.2 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*51.5 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*56.5 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*54.0 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*55.5 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW
11104-28-2	Aroclor 1221	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW
11141-16-5	Aroclor 1232	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW
53469-21-9	Aroclor 1242	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW
12672-29-6	Aroclor 1248	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW
11097-69-1	Aroclor 1254	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW
11096-82-5	Aroclor 1260	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW
1336-36-3	Total PCBs	ND		mg/kg dry	0.0192	0.0192	1	EPA SW 846-8082A	05/24/2013 06:50	05/28/2013 15:50	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*67.0 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*73.6 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**7220**		mg/kg dry	1.15	2.26	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.249	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-38-2	Arsenic	**1.22**		mg/kg dry	0.385	1.13	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-39-3	Barium	**45.2**		mg/kg dry	0.147	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.113	0.113	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.113	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-70-2	Calcium	**1170**		mg/kg dry	0.045	5.65	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW

Sample Information

Client Sample ID: LG-19 (26-28) **York Sample ID:** 13E0744-10

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 1:20 pm	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-47-3	Chromium	**12.2**		mg/kg dry	0.136	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-48-4	Cobalt	**6.37**		mg/kg dry	0.090	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-50-8	Copper	**10.8**		mg/kg dry	0.136	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7439-89-6	Iron	**10200**		mg/kg dry	0.735	2.26	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7439-92-1	Lead	**3.74**		mg/kg dry	0.192	0.339	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7439-95-4	Magnesium	**1950**		mg/kg dry	0.509	5.65	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7439-96-5	Manganese	**202**		mg/kg dry	0.124	1.13	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-02-0	Nickel	**14.0**		mg/kg dry	0.147	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-09-7	Potassium	**1000**		mg/kg dry	3.82	11.3	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7782-49-2	Selenium	**0.671**		mg/kg dry	0.565	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.113	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-23-5	Sodium	**183**	B	mg/kg dry	5.96	11.3	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.362	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-62-2	Vanadium	**14.5**		mg/kg dry	0.124	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW
7440-66-6	Zinc	**23.1**		mg/kg dry	0.102	0.565	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:15	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0373	0.0373	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**88.4**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
71-55-6	1,1,1-Trichloroethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
79-00-5	1,1,2-Trichloroethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-34-3	1,1-Dichloroethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-35-4	1,1-Dichloroethylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
563-58-6	1,1-Dichloropropylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
96-18-4	1,2,3-Trichloropropane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
106-93-4	1,2-Dibromoethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
107-06-2	1,2-Dichloroethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
78-87-5	1,2-Dichloropropane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
142-28-9	1,3-Dichloropropane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
123-91-1	1,4-Dioxane	ND	U	mg/kg dry	0.061	0.12	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
594-20-7	2,2-Dichloropropane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
78-93-3	2-Butanone	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
95-49-8	2-Chlorotoluene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
106-43-4	4-Chlorotoluene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
67-64-1	Acetone	**0.0040**	J, B	mg/kg dry	0.0031	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
71-43-2	Benzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
108-86-1	Bromobenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
74-97-5	Bromochloromethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-27-4	Bromodichloromethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-25-2	Bromoform	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
74-83-9	Bromomethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
56-23-5	Carbon tetrachloride	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-00-3	Chloroethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
67-66-3	Chloroform	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
74-87-3	Chloromethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
124-48-1	Dibromochloromethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
74-95-3	Dibromomethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-71-8	Dichlorodifluoromethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
100-41-4	Ethyl Benzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
98-82-8	Isopropylbenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-09-2	Methylene chloride	**0.0055**	J	mg/kg dry	0.0031	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0031	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
104-51-8	n-Butylbenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
103-65-1	n-Propylbenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
95-47-6	o-Xylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
179601-23-1	p- & m- Xylenes	ND	U	mg/kg dry	0.0061	0.012	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
99-87-6	p-Isopropyltoluene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
135-98-8	sec-Butylbenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
100-42-5	Styrene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
98-06-6	tert-Butylbenzene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
127-18-4	Tetrachloroethylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
108-88-3	Toluene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
79-01-6	Trichloroethylene	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-69-4	Trichlorofluoromethane	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
75-01-4	Vinyl Chloride	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
1330-20-7	Xylenes, Total	ND	U	mg/kg dry	0.0092	0.018	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS
108-05-4	Vinyl acetate	ND	U	mg/kg dry	0.0031	0.0061	1	EPA SW846-8260B	05/23/2013 10:55	05/23/2013 20:52	SS

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5035A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**		**Acceptance Range**							
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*104 %*		*73-130*							
460-00-4	*Surrogate: p-Bromofluorobenzene*	*122 %*		*72-127*							
2037-26-5	*Surrogate: Toluene-d8*	*107 %*		*84-117*							

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND	U	mg/kg dry	0.0699	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
208-96-8	Acenaphthylene	ND	U	mg/kg dry	0.0927	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
62-53-3	Aniline	ND	U	mg/kg dry	0.110	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
120-12-7	Anthracene	ND	U	mg/kg dry	0.105	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
56-55-3	Benzo(a)anthracene	**0.105**	J	mg/kg dry	0.0722	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
50-32-8	Benzo(a)pyrene	**0.102**	J	mg/kg dry	0.0765	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
205-99-2	Benzo(b)fluoranthene	ND	U	mg/kg dry	0.162	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
191-24-2	Benzo(g,h,i)perylene	ND	U	mg/kg dry	0.0641	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
100-51-6	Benzyl alcohol	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
207-08-9	Benzo(k)fluoranthene	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
85-68-7	Benzyl butyl phthalate	ND	U	mg/kg dry	0.107	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
101-55-3	4-Bromophenyl phenyl ether	ND	U	mg/kg dry	0.0931	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
59-50-7	4-Chloro-3-methylphenol	ND	U	mg/kg dry	0.130	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
106-47-8	4-Chloroaniline	ND	U	mg/kg dry	0.0502	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
111-91-1	Bis(2-chloroethoxy)methane	ND	U	mg/kg dry	0.0664	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
111-44-4	Bis(2-chloroethyl)ether	ND	U	mg/kg dry	0.0985	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND	U	mg/kg dry	0.0680	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND	U	mg/kg dry	0.133	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
91-58-7	2-Chloronaphthalene	ND	U	mg/kg dry	0.104	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
95-57-8	2-Chlorophenol	ND	U	mg/kg dry	0.0637	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND	U	mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
218-01-9	Chrysene	**0.102**	J	mg/kg dry	0.0889	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
53-70-3	Dibenzo(a,h)anthracene	ND	U	mg/kg dry	0.0777	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
132-64-9	Dibenzofuran	ND	U	mg/kg dry	0.0900	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
84-74-2	Di-n-butyl phthalate	ND	U	mg/kg dry	0.0784	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
95-50-1	1,2-Dichlorobenzene	ND	U	mg/kg dry	0.126	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
106-46-7	1,4-Dichlorobenzene	ND	U	mg/kg dry	0.119	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
541-73-1	1,3-Dichlorobenzene	ND	U	mg/kg dry	0.0610	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
91-94-1	3,3'-Dichlorobenzidine	ND	U	mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
120-83-2	2,4-Dichlorophenol	ND	U	mg/kg dry	0.158	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
84-66-2	Diethyl phthalate	ND	U	mg/kg dry	0.121	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
105-67-9	2,4-Dimethylphenol	ND	U	mg/kg dry	0.135	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
131-11-3	Dimethyl phthalate	ND	U	mg/kg dry	0.0862	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
88-74-4	2-Nitroaniline	ND	U	mg/kg dry	0.168	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND	U	mg/kg dry	0.243	0.386	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
51-28-5	2,4-Dinitrophenol	ND	U	mg/kg dry	0.162	0.386	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
606-20-2	2,6-Dinitrotoluene	ND	U	mg/kg dry	0.0993	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
121-14-2	2,4-Dinitrotoluene	ND	U	mg/kg dry	0.0854	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
117-84-0	Di-n-octyl phthalate	ND	U	mg/kg dry	0.193	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
206-44-0	Fluoranthene	**0.204**		mg/kg dry	0.113	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
86-73-7	Fluorene	ND	U	mg/kg dry	0.0927	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
118-74-1	Hexachlorobenzene	ND	U	mg/kg dry	0.114	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
87-68-3	Hexachlorobutadiene	ND	U	mg/kg dry	0.0653	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
77-47-4	Hexachlorocyclopentadiene	ND	U	mg/kg dry	0.144	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
67-72-1	Hexachloroethane	ND	U	mg/kg dry	0.0552	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND	U	mg/kg dry	0.0881	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
78-59-1	Isophorone	ND	U	mg/kg dry	0.0664	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
91-57-6	2-Methylnaphthalene	ND	U	mg/kg dry	0.148	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
95-48-7	2-Methylphenol	ND	U	mg/kg dry	0.0734	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
65794-96-9	3- & 4-Methylphenols	ND	U	mg/kg dry	0.0838	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
91-20-3	Naphthalene	ND	U	mg/kg dry	0.0475	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
99-09-2	3-Nitroaniline	ND	U	mg/kg dry	0.192	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
100-01-6	4-Nitroaniline	ND	U	mg/kg dry	0.0800	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
98-95-3	Nitrobenzene	ND	U	mg/kg dry	0.0568	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
100-02-7	4-Nitrophenol	ND	U	mg/kg dry	0.0726	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
88-75-5	2-Nitrophenol	ND	U	mg/kg dry	0.0525	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
621-64-7	N-nitroso-di-n-propylamine	ND	U	mg/kg dry	0.0645	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
62-75-9	N-Nitrosodimethylamine	ND	U	mg/kg dry	0.0792	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Semi-Volatiles, 8270 Target List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND	U	mg/kg dry	0.0873	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
87-86-5	Pentachlorophenol	ND	U	mg/kg dry	0.146	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
85-01-8	Phenanthrene	**0.107**	J	mg/kg dry	0.101	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
108-95-2	Phenol	ND	U	mg/kg dry	0.0834	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
129-00-0	Pyrene	**0.143**	J	mg/kg dry	0.0788	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
110-86-1	Pyridine	ND	U	mg/kg dry	0.136	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
120-82-1	1,2,4-Trichlorobenzene	ND	U	mg/kg dry	0.0699	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
95-95-4	2,4,5-Trichlorophenol	ND	U	mg/kg dry	0.150	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR
88-06-2	2,4,6-Trichlorophenol	ND	U	mg/kg dry	0.0981	0.193	1	EPA SW-846 8270C	05/24/2013 06:47	05/24/2013 23:04	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*79.8 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*63.1 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*57.2 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*62.1 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*62.7 %*	*15-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*59.5 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	mg/kg dry	0.0968	0.0968	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
72-43-5	Methoxychlor	ND	U	mg/kg dry	0.00956	0.00956	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
1024-57-3	Heptachlor epoxide	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
76-44-8	Heptachlor	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
58-89-9	gamma-BHC (Lindane)	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
53494-70-5	Endrin ketone	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
7421-93-4	Endrin aldehyde	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
72-20-8	Endrin	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
1031-07-8	Endosulfan sulfate	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
33213-65-9	Endosulfan II	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
959-98-8	Endosulfan I	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
60-57-1	Dieldrin	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
319-86-8	delta-BHC	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
57-74-9	Chlordane, total	ND	U	mg/kg dry	0.00765	0.00765	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
319-85-7	beta-BHC	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3550B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-84-6	alpha-BHC	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
309-00-2	Aldrin	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
50-29-3	4,4'-DDT	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
72-55-9	4,4'-DDE	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
72-54-8	4,4'-DDD	ND	U	mg/kg dry	0.00191	0.00191	5	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 15:02	JW
11096-82-5	Aroclor 1260	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW
11097-69-1	Aroclor 1254	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW
12672-29-6	Aroclor 1248	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW
53469-21-9	Aroclor 1242	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW
11141-16-5	Aroclor 1232	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW
11104-28-2	Aroclor 1221	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW
12674-11-2	Aroclor 1016	ND	U	mg/kg dry	0.0197	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW
1336-36-3	Total PCBs	ND	U	mg/kg dry	0.00788	0.0197	1	EPA SW 846-8081/8082	05/24/2013 08:59	05/28/2013 16:19	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*58.9 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*47.9 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**14500**		mg/kg dry	1.18	2.32	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-36-0	Antimony	ND	U	mg/kg dry	0.255	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-38-2	Arsenic	**4.60**		mg/kg dry	0.394	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-39-3	Barium	**89.6**		mg/kg dry	0.151	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-41-7	Beryllium	ND	U	mg/kg dry	0.116	0.116	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-43-9	Cadmium	ND	U	mg/kg dry	0.116	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-70-2	Calcium	**1940**		mg/kg dry	0.046	5.79	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-47-3	Chromium	**28.7**		mg/kg dry	0.139	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-48-4	Cobalt	**9.43**		mg/kg dry	0.093	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-50-8	Copper	**18.6**		mg/kg dry	0.139	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7439-89-6	Iron	**20200**		mg/kg dry	0.753	2.32	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7439-92-1	Lead	**143**		mg/kg dry	0.197	0.348	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7439-95-4	Magnesium	**5040**		mg/kg dry	0.522	5.79	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7439-96-5	Manganese	**443**		mg/kg dry	0.127	1.16	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-02-0	Nickel	**25.2**		mg/kg dry	0.151	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW

Sample Information

Client Sample ID: DUP-1 (052113) **York Sample ID:** 13E0744-11

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Soil	May 21, 2013 3:00 pm	05/22/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3050B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-09-7	Potassium	**1040**		mg/kg dry	3.92	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7782-49-2	Selenium	**1.25**		mg/kg dry	0.579	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-22-4	Silver	ND	U	mg/kg dry	0.116	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-23-5	Sodium	**123**	B	mg/kg dry	6.11	11.6	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-28-0	Thallium	ND	U	mg/kg dry	0.371	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-62-2	Vanadium	**31.8**		mg/kg dry	0.127	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW
7440-66-6	Zinc	**84.2**		mg/kg dry	0.104	0.579	1	EPA SW846-6010B	05/23/2013 16:16	05/23/2013 21:44	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7471

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	mg/kg dry	0.0382	0.0382	1	EPA SW846-7471	05/24/2013 10:58	05/24/2013 18:33	AA

Total Solids

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: % Solids Prep

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
solids	% Solids	**86.3**		%	0.100	0.100	1	SM 2540G	05/23/2013 09:08	05/23/2013 12:26	AMC

Sample Information

Client Sample ID: TB_052113 **York Sample ID:** 13E0744-12

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Water	May 21, 2013 3:00 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS

Sample Information

Client Sample ID: TB_052113 **York Sample ID:** 13E0744-12

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Water	May 21, 2013 3:00 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS

Sample Information

Client Sample ID: TB_052113 **York Sample ID:** 13E0744-12

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0744	170246501	Water	May 21, 2013 3:00 pm	05/22/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-09-2	Methylene chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/23/2013 16:30	05/24/2013 03:01	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*101 %*	*72.6-129*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*109 %*	*63.5-145*
2037-26-5	*Surrogate: Toluene-d8*	*99.0 %*	*81.2-127*

Analytical Batch Summary

Batch ID: BE31060 **Preparation Method:** % Solids Prep **Prepared By:** AMC

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-01	MW-5 (0-2)	05/23/13
13E0744-02	MW-5 (6-8)	05/23/13
13E0744-03	LG-20 (0-2)	05/23/13
13E0744-04	LG-20 (22-24)	05/23/13
13E0744-05	LG-21 (0-2)	05/23/13
13E0744-06	LG-21 (20-22)	05/23/13
13E0744-07	MW-10 (1-3)	05/23/13
13E0744-08	MW-10 (32-34)	05/23/13
13E0744-09	LG-19 (0-2)	05/23/13
13E0744-10	LG-19 (26-28)	05/23/13
13E0744-11	DUP-1 (052113)	05/23/13

Batch ID: BE31070 **Preparation Method:** EPA 5035A **Prepared By:** EKM

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-01	MW-5 (0-2)	05/23/13
13E0744-02	MW-5 (6-8)	05/23/13
13E0744-03	LG-20 (0-2)	05/23/13
13E0744-04	LG-20 (22-24)	05/23/13
13E0744-05	LG-21 (0-2)	05/23/13
13E0744-06	LG-21 (20-22)	05/23/13
13E0744-07	MW-10 (1-3)	05/23/13
13E0744-08	MW-10 (32-34)	05/23/13
13E0744-10	LG-19 (26-28)	05/23/13
13E0744-11	DUP-1 (052113)	05/23/13
BE31070-BLK1	Blank	05/23/13
BE31070-BS1	LCS	05/23/13
BE31070-BSD1	LCS Dup	05/23/13
BE31070-MS1	Matrix Spike	05/23/13

Batch ID: BE31101 **Preparation Method:** EPA 5030B **Prepared By:** BK

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-12	TB_052113	05/23/13
BE31101-BLK1	Blank	05/23/13
BE31101-BS1	LCS	05/23/13
BE31101-BSD1	LCS Dup	05/23/13

Batch ID: BE31111 **Preparation Method:** EPA 3050B **Prepared By:** MW

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-01	MW-5 (0-2)	05/23/13
13E0744-02	MW-5 (6-8)	05/23/13
13E0744-03	LG-20 (0-2)	05/23/13
13E0744-04	LG-20 (22-24)	05/23/13

13E0744-05	LG-21 (0-2)	05/23/13
13E0744-06	LG-21 (20-22)	05/23/13
13E0744-07	MW-10 (1-3)	05/23/13
13E0744-08	MW-10 (32-34)	05/23/13
13E0744-09	LG-19 (0-2)	05/23/13
13E0744-10	LG-19 (26-28)	05/23/13
13E0744-11	DUP-1 (052113)	05/23/13
BE31111-BLK1	Blank	05/23/13
BE31111-DUP1	Duplicate	05/23/13
BE31111-MS1	Matrix Spike	05/23/13
BE31111-SRM1	Reference	05/23/13

Batch ID: BE31116 **Preparation Method:** EPA 3550B **Prepared By:** CM

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-01	MW-5 (0-2)	05/24/13
13E0744-03	LG-20 (0-2)	05/24/13
13E0744-05	LG-21 (0-2)	05/24/13
13E0744-07	MW-10 (1-3)	05/24/13
13E0744-09	LG-19 (0-2)	05/24/13
13E0744-11	DUP-1 (052113)	05/24/13
BE31116-BLK1	Blank	05/24/13
BE31116-BS1	LCS	05/24/13
BE31116-BS2	LCS	05/24/13
BE31116-BSD1	LCS Dup	05/24/13
BE31116-MS1	Matrix Spike	05/24/13

Batch ID: BE31117 **Preparation Method:** EPA 3550B **Prepared By:** CC

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-01	MW-5 (0-2)	05/24/13
13E0744-02	MW-5 (6-8)	05/24/13
13E0744-03	LG-20 (0-2)	05/24/13
13E0744-04	LG-20 (22-24)	05/24/13
13E0744-05	LG-21 (0-2)	05/24/13
13E0744-06	LG-21 (20-22)	05/24/13
13E0744-07	MW-10 (1-3)	05/24/13
13E0744-08	MW-10 (32-34)	05/24/13
13E0744-09	LG-19 (0-2)	05/24/13
13E0744-10	LG-19 (26-28)	05/24/13
13E0744-11	DUP-1 (052113)	05/24/13
BE31117-BLK1	Blank	05/24/13
BE31117-BS1	LCS	05/24/13
BE31117-BSD1	LCS Dup	05/24/13

Batch ID: BE31118 **Preparation Method:** EPA 3550B **Prepared By:** CC

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-02	MW-5 (6-8)	05/24/13
13E0744-04	LG-20 (22-24)	05/24/13
13E0744-06	LG-21 (20-22)	05/24/13

13E0744-08	MW-10 (32-34)	05/24/13
13E0744-10	LG-19 (26-28)	05/24/13
BE31118-BLK1	Blank	05/24/13
BE31118-BS1	LCS	05/24/13
BE31118-BSD1	LCS Dup	05/24/13
BE31118-MS1	Matrix Spike	05/24/13

Batch ID: BE31145 **Preparation Method:** EPA SW846-7471 **Prepared By:** AA

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-01	MW-5 (0-2)	05/24/13
13E0744-02	MW-5 (6-8)	05/24/13
13E0744-03	LG-20 (0-2)	05/24/13
13E0744-04	LG-20 (22-24)	05/24/13
13E0744-05	LG-21 (0-2)	05/24/13
13E0744-06	LG-21 (20-22)	05/24/13
13E0744-07	MW-10 (1-3)	05/24/13
13E0744-08	MW-10 (32-34)	05/24/13
13E0744-09	LG-19 (0-2)	05/24/13
13E0744-10	LG-19 (26-28)	05/24/13
13E0744-11	DUP-1 (052113)	05/24/13
BE31145-BLK1	Blank	05/24/13
BE31145-BS1	LCS	05/24/13
BE31145-DUP2	Duplicate	05/24/13
BE31145-MS2	Matrix Spike	05/24/13

Batch ID: BE31233 **Preparation Method:** EPA 5035A **Prepared By:** EKM

YORK Sample ID	Client Sample ID	Preparation Date
13E0744-09	LG-19 (0-2)	05/28/13
BE31233-BLK1	Blank	05/28/13
BE31233-BS1	LCS	05/28/13
BE31233-BSD1	LCS Dup	05/28/13

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31070 - EPA 5035A											
Blank (BE31070-BLK1)											Prepared & Analyzed: 05/23/2013
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet								
1,1,1-Trichloroethane	ND	0.0050	"								
1,1,2,2-Tetrachloroethane	ND	0.0050	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.0050	"								
1,1,2-Trichloroethane	ND	0.0050	"								
1,1-Dichloroethane	ND	0.0050	"								
1,1-Dichloroethylene	ND	0.0050	"								
1,1-Dichloropropylene	ND	0.0050	"								
1,2,3-Trichlorobenzene	ND	0.0050	"								
1,2,3-Trichloropropane	ND	0.0050	"								
1,2,4-Trichlorobenzene	ND	0.0050	"								
1,2,4-Trimethylbenzene	ND	0.0050	"								
1,2-Dibromo-3-chloropropane	ND	0.0050	"								
1,2-Dibromoethane	ND	0.0050	"								
1,2-Dichlorobenzene	ND	0.0050	"								
1,2-Dichloroethane	ND	0.0050	"								
1,2-Dichloropropane	ND	0.0050	"								
1,3,5-Trimethylbenzene	ND	0.0050	"								
1,3-Dichlorobenzene	ND	0.0050	"								
1,3-Dichloropropane	ND	0.0050	"								
1,4-Dichlorobenzene	ND	0.0050	"								
1,4-Dioxane	ND	0.10	"								
2,2-Dichloropropane	ND	0.0050	"								
2-Butanone	ND	0.0050	"								
2-Chlorotoluene	ND	0.0050	"								
4-Chlorotoluene	ND	0.0050	"								
Acetone	0.0031	0.010	"								
Benzene	ND	0.0050	"								
Bromobenzene	ND	0.0050	"								
Bromochloromethane	ND	0.0050	"								
Bromodichloromethane	ND	0.0050	"								
Bromoform	ND	0.0050	"								
Bromomethane	ND	0.0050	"								
Carbon tetrachloride	ND	0.0050	"								
Chlorobenzene	ND	0.0050	"								
Chloroethane	ND	0.0050	"								
Chloroform	ND	0.0050	"								
Chloromethane	ND	0.0050	"								
cis-1,2-Dichloroethylene	ND	0.0050	"								
cis-1,3-Dichloropropylene	ND	0.0050	"								
Dibromochloromethane	ND	0.0050	"								
Dibromomethane	ND	0.0050	"								
Dichlorodifluoromethane	ND	0.0050	"								
Ethyl Benzene	ND	0.0050	"								
Hexachlorobutadiene	ND	0.0050	"								
Isopropylbenzene	ND	0.0050	"								
Methyl tert-butyl ether (MTBE)	ND	0.0050	"								
Methylene chloride	ND	0.010	"								
Naphthalene	ND	0.010	"								
n-Butylbenzene	ND	0.0050	"								
n-Propylbenzene	ND	0.0050	"								

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

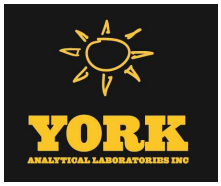
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31070 - EPA 5035A											
Blank (BE31070-BLK1)									Prepared & Analyzed: 05/23/2013		
o-Xylene	ND	0.0050	mg/kg wet								
p- & m- Xylenes	ND	0.010	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
Styrene	ND	0.0050	"								
tert-Butylbenzene	ND	0.0050	"								
Tetrachloroethylene	ND	0.0050	"								
Toluene	ND	0.0050	"								
trans-1,2-Dichloroethylene	ND	0.0050	"								
trans-1,3-Dichloropropylene	ND	0.0050	"								
Trichloroethylene	ND	0.0050	"								
Trichlorofluoromethane	ND	0.0050	"								
Vinyl Chloride	ND	0.0050	"								
Xylenes, Total	ND	0.015	"								
Vinyl acetate	ND	0.0050	"								
Surrogate: 1,2-Dichloroethane-d4	*54.6*		*ug/L*	*50.0*		*109*	*73-130*				
Surrogate: p-Bromofluorobenzene	*54.2*		*"*	*50.0*		*108*	*72-127*				
Surrogate: Toluene-d8	*49.8*		*"*	*50.0*		*99.5*	*84-117*				
LCS (BE31070-BS1)									Prepared & Analyzed: 05/23/2013		
1,1,1,2-Tetrachloroethane	50		ug/L	50.0		99.6	72-132				
1,1,1-Trichloroethane	54		"	50.0		109	77-131				
1,1,2,2-Tetrachloroethane	51		"	50.0		103	68-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	57		"	50.0		114	75-143				
1,1,2-Trichloroethane	50		"	50.0		99.1	72-128				
1,1-Dichloroethane	49		"	50.0		97.5	78-133				
1,1-Dichloroethylene	57		"	50.0		114	71-142				
1,1-Dichloropropylene	50		"	50.0		99.0	77-124				
1,2,3-Trichlorobenzene	57		"	50.0		114	65-134				
1,2,3-Trichloropropane	53		"	50.0		106	65-127				
1,2,4-Trichlorobenzene	57		"	50.0		114	59-133				
1,2,4-Trimethylbenzene	52		"	50.0		103	68-128				
1,2-Dibromo-3-chloropropane	50		"	50.0		101	58-145				
1,2-Dibromoethane	52		"	50.0		105	73-128				
1,2-Dichlorobenzene	50		"	50.0		99.7	69-126				
1,2-Dichloroethane	51		"	50.0		102	78-131				
1,2-Dichloropropane	51		"	50.0		101	72-129				
1,3,5-Trimethylbenzene	51		"	50.0		103	67-125				
1,3-Dichlorobenzene	51		"	50.0		102	67-125				
1,3-Dichloropropane	49		"	50.0		97.9	73-126				
1,4-Dichlorobenzene	51		"	50.0		102	67-127				
1,4-Dioxane	7.1		"	50.0		14.1	10-265				
2,2-Dichloropropane	55		"	50.0		110	68-133				
2-Butanone	46		"	50.0		92.2	49-138				
2-Chlorotoluene	51		"	50.0		101	61-121				
4-Chlorotoluene	51		"	50.0		103	65-126				
Acetone	41		"	50.0		82.2	21-131				
Benzene	54		"	50.0		108	81-125				
Bromobenzene	49		"	50.0		98.0	65-125				
Bromochloromethane	55		"	50.0		109	78-127				
Bromodichloromethane	54		"	50.0		107	73-131				
Bromoform	56		"	50.0		113	66-137				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31070 - EPA 5035A											
LCS (BE31070-BS1)								Prepared & Analyzed: 05/23/2013			
Bromomethane	49		ug/L	50.0		97.9	55-144				
Carbon tetrachloride	55		"	50.0		109	74-137				
Chlorobenzene	50		"	50.0		99.2	75-127				
Chloroethane	55		"	50.0		109	65-138				
Chloroform	53		"	50.0		106	82-128				
Chloromethane	49		"	50.0		98.5	51-138				
cis-1,2-Dichloroethylene	54		"	50.0		108	77-130				
cis-1,3-Dichloropropylene	55		"	50.0		110	68-123				
Dibromochloromethane	54		"	50.0		109	73-136				
Dibromomethane	52		"	50.0		104	75-131				
Dichlorodifluoromethane	38		"	50.0		76.7	10-183				
Ethyl Benzene	53		"	50.0		106	75-130				
Hexachlorobutadiene	48		"	50.0		95.9	59-130				
Isopropylbenzene	52		"	50.0		104	68-135				
Methyl tert-butyl ether (MTBE)	56		"	50.0		112	76-136				
Methylene chloride	56		"	50.0		113	55-143				
Naphthalene	60		"	50.0		121	65-140				
n-Butylbenzene	54		"	50.0		108	63-123				
n-Propylbenzene	53		"	50.0		107	65-127				
o-Xylene	50		"	50.0		99.2	71-123				
p- & m- Xylenes	110		"	100		108	72-127				
p-Isopropyltoluene	53		"	50.0		105	69-128				
sec-Butylbenzene	53		"	50.0		106	69-125				
Styrene	51		"	50.0		102	74-127				
tert-Butylbenzene	52		"	50.0		104	59-164				
Tetrachloroethylene	49		"	50.0		97.1	65-151				
Toluene	51		"	50.0		102	72-127				
trans-1,2-Dichloroethylene	56		"	50.0		112	73-137				
trans-1,3-Dichloropropylene	52		"	50.0		104	67-131				
Trichloroethylene	50		"	50.0		100	73-129				
Trichlorofluoromethane	54		"	50.0		108	69-136				
Vinyl Chloride	48		"	50.0		97.0	58-132				
Vinyl acetate	45		"	50.0		89.6	10-84	High Bias			
Surrogate: 1,2-Dichloroethane-d4	*51.5*		*"*	*50.0*		*103*	*73-130*				
Surrogate: p-Bromofluorobenzene	*50.3*		*"*	*50.0*		*101*	*72-127*				
Surrogate: Toluene-d8	*49.2*		*"*	*50.0*		*98.4*	*84-117*				



Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31070 - EPA 5035A											
LCS Dup (BE31070-BSD1)								Prepared & Analyzed: 05/23/2013			
1,1,1,2-Tetrachloroethane	49		ug/L	50.0		97.8	72-132		1.88	30	
1,1,1-Trichloroethane	52		"	50.0		104	77-131		4.61	30	
1,1,2,2-Tetrachloroethane	50		"	50.0		99.3	68-129		3.19	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	54		"	50.0		107	75-143		5.88	30	
1,1,2-Trichloroethane	48		"	50.0		95.4	72-128		3.84	30	
1,1-Dichloroethane	56		"	50.0		112	78-133		13.5	30	
1,1-Dichloroethylene	54		"	50.0		109	71-142		5.00	30	
1,1-Dichloropropylene	48		"	50.0		96.6	77-124		2.47	30	
1,2,3-Trichlorobenzene	54		"	50.0		109	65-134		4.58	30	
1,2,3-Trichloropropane	52		"	50.0		105	65-127		0.892	30	
1,2,4-Trichlorobenzene	55		"	50.0		110	59-133		3.18	30	
1,2,4-Trimethylbenzene	50		"	50.0		100	68-128		2.97	30	
1,2-Dibromo-3-chloropropane	51		"	50.0		103	58-145		2.12	30	
1,2-Dibromoethane	50		"	50.0		101	73-128		3.52	30	
1,2-Dichlorobenzene	49		"	50.0		97.0	69-126		2.70	30	
1,2-Dichloroethane	49		"	50.0		98.2	78-131		3.76	30	
1,2-Dichloropropane	50		"	50.0		99.1	72-129		1.92	30	
1,3,5-Trimethylbenzene	50		"	50.0		101	67-125		1.75	30	
1,3-Dichlorobenzene	50		"	50.0		99.8	67-125		2.24	30	
1,3-Dichloropropane	48		"	50.0		95.3	73-126		2.69	30	
1,4-Dichlorobenzene	50		"	50.0		99.1	67-127		3.41	30	
1,4-Dioxane	1.6		"	50.0		3.12	10-265	Low Bias	128	30	Non-dir.
2,2-Dichloropropane	52		"	50.0		104	68-133		5.68	30	
2-Butanone	45		"	50.0		90.3	49-138		1.99	30	
2-Chlorotoluene	49		"	50.0		98.3	61-121		3.03	30	
4-Chlorotoluene	50		"	50.0		100	65-126		2.42	30	
Acetone	36		"	50.0		71.7	21-131		13.7	30	
Benzene	51		"	50.0		103	81-125		5.11	30	
Bromobenzene	47		"	50.0		94.2	65-125		3.91	30	
Bromochloromethane	53		"	50.0		106	78-127		2.86	30	
Bromodichloromethane	52		"	50.0		103	73-131		3.86	30	
Bromoform	54		"	50.0		107	66-137		5.03	30	
Bromomethane	47		"	50.0		93.1	55-144		4.96	30	
Carbon tetrachloride	52		"	50.0		103	74-137		5.59	30	
Chlorobenzene	48		"	50.0		96.0	75-127		3.34	30	
Chloroethane	51		"	50.0		103	65-138		5.81	30	
Chloroform	51		"	50.0		103	82-128		3.37	30	
Chloromethane	47		"	50.0		93.7	51-138		4.95	30	
cis-1,2-Dichloroethylene	50		"	50.0		101	77-130		7.08	30	
cis-1,3-Dichloropropylene	52		"	50.0		104	68-123		4.77	30	
Dibromochloromethane	53		"	50.0		106	73-136		2.59	30	
Dibromomethane	52		"	50.0		103	75-131		0.848	30	
Dichlorodifluoromethane	36		"	50.0		71.7	10-183		6.74	30	
Ethyl Benzene	52		"	50.0		103	75-130		2.58	30	
Hexachlorobutadiene	47		"	50.0		94.9	59-130		1.07	30	
Isopropylbenzene	50		"	50.0		101	68-135		3.19	30	
Methyl tert-butyl ether (MTBE)	52		"	50.0		104	76-136		7.35	30	
Methylene chloride	54		"	50.0		108	55-143		4.77	30	
Naphthalene	59		"	50.0		118	65-140		2.56	30	
n-Butylbenzene	52		"	50.0		105	63-123		2.41	30	
n-Propylbenzene	52		"	50.0		104	65-127		2.31	30	

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31070 - EPA 5035A											
LCS Dup (BE31070-BSD1)								Prepared & Analyzed: 05/23/2013			
o-Xylene	48		ug/L	50.0		96.3	71-123		2.97	30	
p- & m- Xylenes	110		"	100		105	72-127		2.22	30	
p-Isopropyltoluene	51		"	50.0		103	69-128		2.60	30	
sec-Butylbenzene	52		"	50.0		105	69-125		1.73	30	
Styrene	50		"	50.0		100	74-127		2.17	30	
tert-Butylbenzene	50		"	50.0		100	59-164		3.29	30	
Tetrachloroethylene	49		"	50.0		97.6	65-151		0.493	30	
Toluene	50		"	50.0		99.7	72-127		2.26	30	
trans-1,2-Dichloroethylene	53		"	50.0		107	73-137		4.85	30	
trans-1,3-Dichloropropylene	50		"	50.0		100	67-131		3.91	30	
Trichloroethylene	49		"	50.0		97.8	73-129		2.68	30	
Trichlorofluoromethane	51		"	50.0		103	69-136		4.85	30	
Vinyl Chloride	46		"	50.0		91.4	58-132		5.86	30	
Vinyl acetate	44		"	50.0		87.9	10-84	High Bias	1.94	30	
Surrogate: 1,2-Dichloroethane-d4	*49.2*		*"*	*50.0*		*98.4*	*73-130*				
Surrogate: p-Bromofluorobenzene	*51.1*		*"*	*50.0*		*102*	*72-127*				
Surrogate: Toluene-d8	*49.5*		*"*	*50.0*		*98.9*	*84-117*				
Matrix Spike (BE31070-MS1)	*Source sample: 13E0744-01 (MW-5 (0-2))							Prepared & Analyzed: 05/23/2013			
1,1,1,2-Tetrachloroethane	44		ug/L	50.0	ND	88.3	48-129				
1,1,1-Trichloroethane	47		"	50.0	ND	94.1	60-128				
1,1,2,2-Tetrachloroethane	47		"	50.0	ND	94.2	20-143				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	47		"	50.0	ND	93.4	52-129				
1,1,2-Trichloroethane	46		"	50.0	ND	92.6	53-126				
1,1-Dichloroethane	44		"	50.0	ND	87.4	62-129				
1,1-Dichloroethylene	52		"	50.0	ND	103	50-138				
1,1-Dichloropropylene	43		"	50.0	ND	85.1	49-120				
1,2,3-Trichlorobenzene	39		"	50.0	ND	77.3	10-120				
1,2,3-Trichloropropane	53		"	50.0	ND	105	42-132				
1,2,4-Trichlorobenzene	36		"	50.0	ND	71.8	10-113				
1,2,4-Trimethylbenzene	43		"	50.0	ND	85.6	10-173				
1,2-Dibromo-3-chloropropane	48		"	50.0	ND	95.9	16-151				
1,2-Dibromoethane	47		"	50.0	ND	93.7	37-134				
1,2-Dichlorobenzene	41		"	50.0	ND	83.0	12-121				
1,2-Dichloroethane	47		"	50.0	ND	93.2	53-133				
1,2-Dichloropropane	46		"	50.0	ND	92.3	58-126				
1,3,5-Trimethylbenzene	44		"	50.0	ND	87.1	10-155				
1,3-Dichlorobenzene	41		"	50.0	ND	81.2	12-116				
1,3-Dichloropropane	45		"	50.0	ND	90.6	50-127				
1,4-Dichlorobenzene	40		"	50.0	ND	79.8	9-118				
1,4-Dioxane	1.6		"	50.0	ND	3.14	10-249	Low Bias			
2,2-Dichloropropane	44		"	50.0	ND	88.7	47-119				
2-Butanone	47		"	50.0	ND	94.0	13-140				
2-Chlorotoluene	43		"	50.0	ND	85.2	24-115				
4-Chlorotoluene	42		"	50.0	ND	84.0	22-115				
Acetone	43		"	50.0	1.2	83.1	10-130				
Benzene	49		"	50.0	ND	98.6	52-127				
Bromobenzene	43		"	50.0	ND	85.2	27-119				
Bromochloromethane	50		"	50.0	ND	99.7	52-129				
Bromodichloromethane	47		"	50.0	ND	94.5	50-132				
Bromoform	49		"	50.0	ND	97.4	31-138				
Bromomethane	41		"	50.0	ND	81.1	20-141				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31070 - EPA 5035A											
Matrix Spike (BE31070-MS1)	*Source sample: 13E0744-01 (MW-5 (0-2))							Prepared & Analyzed: 05/23/2013			
Carbon tetrachloride	46		ug/L	50.0	ND	91.1	52-131				
Chlorobenzene	43		"	50.0	ND	85.3	36-125				
Chloroethane	51		"	50.0	ND	102	35-143				
Chloroform	48		"	50.0	ND	95.5	62-127				
Chloromethane	41		"	50.0	ND	83.0	36-128				
cis-1,2-Dichloroethylene	48		"	50.0	ND	96.3	51-128				
cis-1,3-Dichloropropylene	47		"	50.0	ND	93.8	27-126				
Dibromochloromethane	48		"	50.0	ND	96.5	42-137				
Dibromomethane	50		"	50.0	ND	99.4	47-136				
Dichlorodifluoromethane	28		"	50.0	ND	56.0	10-143				
Ethyl Benzene	45		"	50.0	ND	90.8	32-131				
Hexachlorobutadiene	31		"	50.0	ND	62.6	10-109				
Isopropylbenzene	45		"	50.0	ND	90.5	21-143				
Methyl tert-butyl ether (MTBE)	52		"	50.0	ND	104	55-144				
Methylene chloride	54		"	50.0	2.7	102	17-147				
Naphthalene	47		"	50.0	ND	94.0	10-142				
n-Butylbenzene	39		"	50.0	ND	78.3	10-116				
n-Propylbenzene	45		"	50.0	ND	89.4	70-130				
o-Xylene	43		"	50.0	ND	85.5	70-130				
p- & m- Xylenes	91		"	100	ND	91.5	70-130				
p-Isopropyltoluene	42		"	50.0	ND	84.3	70-130				
sec-Butylbenzene	45		"	50.0	ND	89.2	12-129				
Styrene	43		"	50.0	ND	85.2	13-130				
tert-Butylbenzene	42		"	50.0	ND	83.6	20-149				
Tetrachloroethylene	57		"	50.0	ND	115	26-179				
Toluene	46		"	50.0	ND	91.2	30-138				
trans-1,2-Dichloroethylene	50		"	50.0	ND	101	46-132				
trans-1,3-Dichloropropylene	44		"	50.0	ND	88.2	20-132				
Trichloroethylene	45		"	50.0	ND	90.6	31-152				
Trichlorofluoromethane	46		"	50.0	ND	92.3	50-129				
Vinyl Chloride	42		"	50.0	ND	83.9	41-124				
Vinyl acetate	22		"	50.0	ND	44.0	10-62				
Surrogate: 1,2-Dichloroethane-d4	*52.0*		*"*	*50.0*		*104*	*73-130*				
Surrogate: p-Bromofluorobenzene	*51.4*		*"*	*50.0*		*103*	*72-127*				
Surrogate: Toluene-d8	*49.4*		*"*	*50.0*		*98.7*	*84-117*				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31101 - EPA 5030B											
Blank (BE31101-BLK1)											
Prepared: 05/23/2013 Analyzed: 05/24/2013											
1,1,1,2-Tetrachloroethane	ND	5.0	ug/L								
1,1,1-Trichloroethane	ND	5.0	"								
1,1,2,2-Tetrachloroethane	ND	5.0	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"								
1,1,2-Trichloroethane	ND	5.0	"								
1,1-Dichloroethane	ND	5.0	"								
1,1-Dichloroethylene	ND	5.0	"								
1,1-Dichloropropylene	ND	5.0	"								
1,2,3-Trichlorobenzene	ND	5.0	"								
1,2,3-Trichloropropane	ND	5.0	"								
1,2,4-Trichlorobenzene	ND	5.0	"								
1,2,4-Trimethylbenzene	ND	5.0	"								
1,2-Dibromo-3-chloropropane	ND	5.0	"								
1,2-Dibromoethane	ND	5.0	"								
1,2-Dichlorobenzene	ND	5.0	"								
1,2-Dichloroethane	ND	5.0	"								
1,2-Dichloropropane	ND	5.0	"								
1,3,5-Trimethylbenzene	ND	5.0	"								
1,3-Dichlorobenzene	ND	5.0	"								
1,3-Dichloropropane	ND	5.0	"								
1,4-Dichlorobenzene	ND	5.0	"								
2,2-Dichloropropane	ND	5.0	"								
2-Butanone	ND	5.0	"								
2-Chlorotoluene	ND	5.0	"								
4-Chlorotoluene	ND	5.0	"								
Acetone	ND	5.0	"								
Benzene	ND	5.0	"								
Bromobenzene	ND	5.0	"								
Bromochloromethane	ND	5.0	"								
Bromodichloromethane	ND	5.0	"								
Bromoform	ND	5.0	"								
Bromomethane	ND	5.0	"								
Carbon tetrachloride	ND	5.0	"								
Chlorobenzene	ND	5.0	"								
Chloroethane	ND	5.0	"								
Chloroform	ND	5.0	"								
Chloromethane	ND	5.0	"								
cis-1,2-Dichloroethylene	ND	5.0	"								
cis-1,3-Dichloropropylene	ND	5.0	"								
Dibromochloromethane	ND	5.0	"								
Dibromomethane	ND	5.0	"								
Dichlorodifluoromethane	ND	5.0	"								
Ethyl Benzene	ND	5.0	"								
Hexachlorobutadiene	ND	5.0	"								
Isopropylbenzene	ND	5.0	"								
Methyl tert-butyl ether (MTBE)	ND	5.0	"								
Methylene chloride	ND	5.0	"								
Naphthalene	ND	5.0	"								
n-Butylbenzene	ND	5.0	"								
n-Propylbenzene	ND	5.0	"								
o-Xylene	ND	5.0	"								

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

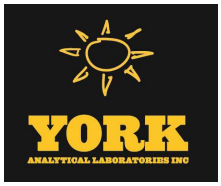
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31101 - EPA 5030B											
Blank (BE31101-BLK1)											Prepared: 05/23/2013 Analyzed: 05/24/2013
p- & m- Xylenes	ND	10	ug/L								
p-Isopropyltoluene	ND	5.0	"								
sec-Butylbenzene	ND	5.0	"								
Styrene	ND	5.0	"								
tert-Butylbenzene	ND	5.0	"								
Tetrachloroethylene	ND	5.0	"								
Toluene	ND	5.0	"								
trans-1,2-Dichloroethylene	ND	5.0	"								
trans-1,3-Dichloropropylene	ND	5.0	"								
Trichloroethylene	ND	5.0	"								
Trichlorofluoromethane	ND	5.0	"								
Vinyl Chloride	ND	5.0	"								
Xylenes, Total	ND	15	"								
Vinyl acetate	ND	5.0	"								
Surrogate: 1,2-Dichloroethane-d4	*9.81*		*"*	*10.0*		*98.1*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*11.2*		*"*	*10.0*		*112*	*63.5-145*				
Surrogate: Toluene-d8	*10.0*		*"*	*10.0*		*100*	*81.2-127*				
LCS (BE31101-BS1)											Prepared: 05/23/2013 Analyzed: 05/24/2013
1,1,1,2-Tetrachloroethane	10		ug/L	10.0		102	82.3-130				
1,1,1-Trichloroethane	10		"	10.0		99.8	75.6-137				
1,1,2,2-Tetrachloroethane	11		"	10.0		106	71.3-131				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	12		"	10.0		118	71.1-129				
1,1,2-Trichloroethane	10		"	10.0		101	74.5-129				
1,1-Dichloroethane	9.7		"	10.0		97.0	79.6-132				
1,1-Dichloroethylene	12		"	10.0		115	80.2-146				
1,1-Dichloropropylene	9.6		"	10.0		95.9	75-136				
1,2,3-Trichlorobenzene	11		"	10.0		115	66.1-136				
1,2,3-Trichloropropane	10		"	10.0		103	63-131				
1,2,4-Trichlorobenzene	11		"	10.0		114	70.6-136				
1,2,4-Trimethylbenzene	9.9		"	10.0		99.0	75.3-135				
1,2-Dibromo-3-chloropropane	9.8		"	10.0		97.5	58.9-140				
1,2-Dibromoethane	10		"	10.0		103	79-130				
1,2-Dichlorobenzene	9.9		"	10.0		99.0	76.1-122				
1,2-Dichloroethane	9.7		"	10.0		96.8	74.6-132				
1,2-Dichloropropane	9.8		"	10.0		97.5	76.9-129				
1,3,5-Trimethylbenzene	9.7		"	10.0		96.9	70.6-127				
1,3-Dichlorobenzene	9.8		"	10.0		98.1	77-124				
1,3-Dichloropropane	9.7		"	10.0		97.2	75.8-126				
1,4-Dichlorobenzene	9.8		"	10.0		97.5	76.6-125				
2,2-Dichloropropane	8.0		"	10.0		79.7	69-133				
2-Butanone	11		"	10.0		110	70-130				
2-Chlorotoluene	9.3		"	10.0		92.7	66.3-119				
4-Chlorotoluene	9.6		"	10.0		95.9	69.2-127				
Acetone	12		"	10.0		120	70-130				
Benzene	10		"	10.0		104	76.2-129				
Bromobenzene	9.6		"	10.0		95.9	71.3-123				
Bromochloromethane	10		"	10.0		99.8	70.8-137				
Bromodichloromethane	10		"	10.0		101	79.7-134				
Bromoform	11		"	10.0		105	70.5-141				
Bromomethane	9.9		"	10.0		99.0	43.9-147				
Carbon tetrachloride	10		"	10.0		101	78.1-138				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31101 - EPA 5030B											
LCS (BE31101-BS1)								Prepared: 05/23/2013 Analyzed: 05/24/2013			
Chlorobenzene	9.6		ug/L	10.0		96.5	80.4-125				
Chloroethane	11		"	10.0		111	55.8-140				
Chloroform	9.7		"	10.0		97.3	76.6-133				
Chloromethane	9.0		"	10.0		89.7	48.8-115				
cis-1,2-Dichloroethylene	10		"	10.0		103	75.1-128				
cis-1,3-Dichloropropylene	9.9		"	10.0		99.4	74.5-128				
Dibromochloromethane	10		"	10.0		104	79.8-134				
Dibromomethane	9.7		"	10.0		97.1	79-130				
Dichlorodifluoromethane	6.8		"	10.0		67.7	47.1-101				
Ethyl Benzene	9.9		"	10.0		99.2	80.8-128				
Hexachlorobutadiene	8.4		"	10.0		83.7	64.8-128				
Isopropylbenzene	9.9		"	10.0		99.1	75.5-135				
Methyl tert-butyl ether (MTBE)	11		"	10.0		109	65.1-140				
Methylene chloride	11		"	10.0		109	61.3-120				
Naphthalene	13		"	10.0		130	62.3-148				
n-Butylbenzene	10		"	10.0		102	67.2-123				
n-Propylbenzene	10		"	10.0		99.6	70.5-127				
o-Xylene	9.5		"	10.0		95.0	75.9-122				
p- & m- Xylenes	20		"	20.0		102	77.7-127				
p-Isopropyltoluene	10		"	10.0		100	75.6-129				
sec-Butylbenzene	10		"	10.0		102	71.5-125				
Styrene	11		"	10.0		108	77.8-123				
tert-Butylbenzene	9.7		"	10.0		97.3	75.9-151				
Tetrachloroethylene	9.3		"	10.0		92.6	63.6-167				
Toluene	9.8		"	10.0		98.1	77-123				
trans-1,2-Dichloroethylene	11		"	10.0		108	76.3-139				
trans-1,3-Dichloropropylene	9.6		"	10.0		95.9	72.5-137				
Trichloroethylene	10		"	10.0		101	77.9-130				
Trichlorofluoromethane	11		"	10.0		112	57.4-133				
Vinyl Chloride	9.8		"	10.0		98.1	54.9-124				
Vinyl acetate	6.3		"	10.0		63.1	70-130	Low Bias			
Surrogate: 1,2-Dichloroethane-d4	*9.80*		*"*	*10.0*		*98.0*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*9.89*		*"*	*10.0*		*98.9*	*63.5-145*				
Surrogate: Toluene-d8	*10.0*		*"*	*10.0*		*100*	*81.2-127*				



Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31101 - EPA 5030B											
LCS Dup (BE31101-BSD1)								Prepared: 05/23/2013 Analyzed: 05/24/2013			
1,1,1,2-Tetrachloroethane	9.7		ug/L	10.0		96.6	82.3-130		5.34	21.1	
1,1,1-Trichloroethane	9.6		"	10.0		96.2	75.6-137		3.67	19.7	
1,1,2,2-Tetrachloroethane	10		"	10.0		99.9	71.3-131		5.83	20.8	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	11		"	10.0		113	71.1-129		4.23	21.7	
1,1,2-Trichloroethane	9.6		"	10.0		96.5	74.5-129		4.95	20.3	
1,1-Dichloroethane	9.3		"	10.0		92.6	79.6-132		4.64	20.6	
1,1-Dichloroethylene	11		"	10.0		108	80.2-146		6.65	20	
1,1-Dichloropropylene	9.0		"	10.0		89.9	75-136		6.46	19.3	
1,2,3-Trichlorobenzene	11		"	10.0		113	66.1-136		1.32	21.6	
1,2,3-Trichloropropane	9.7		"	10.0		96.6	63-131		6.02	23.9	
1,2,4-Trichlorobenzene	10		"	10.0		105	70.6-136		8.49	21.7	
1,2,4-Trimethylbenzene	8.8		"	10.0		88.5	75.3-135		11.2	18.8	
1,2-Dibromo-3-chloropropane	9.1		"	10.0		90.7	58.9-140		7.23	27.7	
1,2-Dibromoethane	9.9		"	10.0		99.2	79-130		4.05	23	
1,2-Dichlorobenzene	9.0		"	10.0		90.1	76.1-122		9.41	19.8	
1,2-Dichloroethane	9.2		"	10.0		91.6	74.6-132		5.52	20.2	
1,2-Dichloropropane	9.2		"	10.0		91.9	76.9-129		5.91	20.7	
1,3,5-Trimethylbenzene	8.9		"	10.0		88.7	70.6-127		8.84	18.9	
1,3-Dichlorobenzene	9.2		"	10.0		91.8	77-124		6.64	19.2	
1,3-Dichloropropane	9.0		"	10.0		90.4	75.8-126		7.25	22.1	
1,4-Dichlorobenzene	9.1		"	10.0		91.4	76.6-125		6.46	18.6	
2,2-Dichloropropane	7.4		"	10.0		74.4	69-133		6.88	19.8	
2-Butanone	10		"	10.0		104	70-130		4.86	30	
2-Chlorotoluene	8.6		"	10.0		86.2	66.3-119		7.27	21.6	
4-Chlorotoluene	9.0		"	10.0		90.3	69.2-127		6.02	19	
Acetone	10		"	10.0		102	70-130		16.1	30	
Benzene	9.8		"	10.0		98.5	76.2-129		5.62	19	
Bromobenzene	8.9		"	10.0		88.6	71.3-123		7.91	20.3	
Bromochloromethane	9.3		"	10.0		93.4	70.8-137		6.63	23.9	
Bromodichloromethane	9.7		"	10.0		97.1	79.7-134		4.23	21	
Bromoform	9.8		"	10.0		97.9	70.5-141		7.38	21.8	
Bromomethane	9.7		"	10.0		96.9	43.9-147		2.14	28.4	
Carbon tetrachloride	9.5		"	10.0		95.1	78.1-138		5.82	20.1	
Chlorobenzene	9.2		"	10.0		91.6	80.4-125		5.21	19.9	
Chloroethane	10		"	10.0		104	55.8-140		6.32	23.3	
Chloroform	9.3		"	10.0		93.2	76.6-133		4.30	20.3	
Chloromethane	8.9		"	10.0		88.9	48.8-115		0.896	24.5	
cis-1,2-Dichloroethylene	9.8		"	10.0		97.9	75.1-128		4.69	20.5	
cis-1,3-Dichloropropylene	9.6		"	10.0		96.2	74.5-128		3.27	19.9	
Dibromochloromethane	9.9		"	10.0		98.9	79.8-134		5.12	21.3	
Dibromomethane	9.2		"	10.0		91.6	79-130		5.83	22.4	
Dichlorodifluoromethane	6.4		"	10.0		63.5	47.1-101		6.40	23.9	
Ethyl Benzene	9.4		"	10.0		94.4	80.8-128		4.96	19.2	
Hexachlorobutadiene	8.4		"	10.0		83.9	64.8-128		0.239	20.6	
Isopropylbenzene	9.1		"	10.0		91.1	75.5-135		8.41	20	
Methyl tert-butyl ether (MTBE)	8.3		"	10.0		83.4	65.1-140		26.2	23.6	Non-dir.
Methylene chloride	11		"	10.0		105	61.3-120		3.92	20.4	
Naphthalene	12		"	10.0		125	62.3-148		4.00	27.1	
n-Butylbenzene	9.3		"	10.0		93.3	67.2-123		8.71	19.1	
n-Propylbenzene	9.2		"	10.0		91.9	70.5-127		8.04	23.4	
o-Xylene	8.9		"	10.0		88.7	75.9-122		6.86	19.3	

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31101 - EPA 5030B											
LCS Dup (BE31101-BSD1)									Prepared: 05/23/2013 Analyzed: 05/24/2013		
p- & m- Xylenes	19		ug/L	20.0		95.8	77.7-127		6.76	18.6	
p-Isopropyltoluene	9.2		"	10.0		92.0	75.6-129		8.53	19.1	
sec-Butylbenzene	9.4		"	10.0		94.2	71.5-125		7.95	18.9	
Styrene	9.6		"	10.0		95.8	77.8-123		11.8	20.9	
tert-Butylbenzene	9.2		"	10.0		92.1	75.9-151		5.49	20.9	
Tetrachloroethylene	8.8		"	10.0		87.6	63.6-167		5.55	27.7	
Toluene	9.2		"	10.0		91.8	77-123		6.64	18.7	
trans-1,2-Dichloroethylene	8.2		"	10.0		81.5	76.3-139		27.8	19.5	Non-dir.
trans-1,3-Dichloropropylene	9.2		"	10.0		92.2	72.5-137		3.93	19.3	
Trichloroethylene	9.5		"	10.0		94.8	77.9-130		6.43	20.5	
Trichlorofluoromethane	10		"	10.0		103	57.4-133		8.01	21.4	
Vinyl Chloride	9.2		"	10.0		91.5	54.9-124		6.96	22.3	
Vinyl acetate	6.3		"	10.0		62.9	70-130	Low Bias	0.317	30	
Surrogate: 1,2-Dichloroethane-d4	*9.78*		*"*	*10.0*		*97.8*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*9.93*		*"*	*10.0*		*99.3*	*63.5-145*				
Surrogate: Toluene-d8	*9.92*		*"*	*10.0*		*99.2*	*81.2-127*				
Batch BE31233 - EPA 5035A											
Blank (BE31233-BLK1)									Prepared: 05/28/2013 Analyzed: 05/29/2013		
1,1,1,2-Tetrachloroethane	ND	0.0050	mg/kg wet								
1,1,1-Trichloroethane	ND	0.0050	"								
1,1,2,2-Tetrachloroethane	ND	0.0050	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	0.0050	"								
1,1,2-Trichloroethane	ND	0.0050	"								
1,1-Dichloroethane	ND	0.0050	"								
1,1-Dichloroethylene	ND	0.0050	"								
1,1-Dichloropropylene	ND	0.0050	"								
1,2,3-Trichlorobenzene	ND	0.0050	"								
1,2,3-Trichloropropane	ND	0.0050	"								
1,2,4-Trichlorobenzene	ND	0.0050	"								
1,2,4-Trimethylbenzene	ND	0.0050	"								
1,2-Dibromo-3-chloropropane	ND	0.0050	"								
1,2-Dibromoethane	ND	0.0050	"								
1,2-Dichlorobenzene	ND	0.0050	"								
1,2-Dichloroethane	ND	0.0050	"								
1,2-Dichloropropane	ND	0.0050	"								
1,3,5-Trimethylbenzene	ND	0.0050	"								
1,3-Dichlorobenzene	ND	0.0050	"								
1,3-Dichloropropane	ND	0.0050	"								
1,4-Dichlorobenzene	ND	0.0050	"								
1,4-Dioxane	ND	0.10	"								
2,2-Dichloropropane	ND	0.0050	"								
2-Butanone	ND	0.0050	"								
2-Chlorotoluene	ND	0.0050	"								
4-Chlorotoluene	ND	0.0050	"								
Acetone	ND	0.010	"								
Benzene	ND	0.0050	"								
Bromobenzene	ND	0.0050	"								
Bromochloromethane	ND	0.0050	"								
Bromodichloromethane	ND	0.0050	"								
Bromoform	ND	0.0050	"								

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31233 - EPA 5035A											
Blank (BE31233-BLK1)											
Prepared: 05/28/2013 Analyzed: 05/29/2013											
Bromomethane	ND	0.0050	mg/kg wet								
Carbon tetrachloride	ND	0.0050	"								
Chlorobenzene	ND	0.0050	"								
Chloroethane	ND	0.0050	"								
Chloroform	ND	0.0050	"								
Chloromethane	ND	0.0050	"								
cis-1,2-Dichloroethylene	ND	0.0050	"								
cis-1,3-Dichloropropylene	ND	0.0050	"								
Dibromochloromethane	ND	0.0050	"								
Dibromomethane	ND	0.0050	"								
Dichlorodifluoromethane	ND	0.0050	"								
Ethyl Benzene	ND	0.0050	"								
Hexachlorobutadiene	ND	0.0050	"								
Isopropylbenzene	ND	0.0050	"								
Methyl tert-butyl ether (MTBE)	ND	0.0050	"								
Methylene chloride	0.0031	0.010	"								
Naphthalene	ND	0.010	"								
n-Butylbenzene	ND	0.0050	"								
n-Propylbenzene	ND	0.0050	"								
o-Xylene	ND	0.0050	"								
p- & m- Xylenes	ND	0.010	"								
p-Isopropyltoluene	ND	0.0050	"								
sec-Butylbenzene	ND	0.0050	"								
Styrene	ND	0.0050	"								
tert-Butylbenzene	ND	0.0050	"								
Tetrachloroethylene	ND	0.0050	"								
Toluene	ND	0.0050	"								
trans-1,2-Dichloroethylene	ND	0.0050	"								
trans-1,3-Dichloropropylene	ND	0.0050	"								
Trichloroethylene	ND	0.0050	"								
Trichlorofluoromethane	ND	0.0050	"								
Vinyl Chloride	ND	0.0050	"								
Xylenes, Total	ND	0.015	"								
Vinyl acetate	ND	0.0050	"								
Surrogate: 1,2-Dichloroethane-d4	*50.6*		*ug/L*	*50.0*		*101*	*73-130*				
Surrogate: p-Bromofluorobenzene	*56.4*		*"*	*50.0*		*113*	*72-127*				
Surrogate: Toluene-d8	*51.0*		*"*	*50.0*		*102*	*84-117*				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31233 - EPA 5035A											
LCS (BE31233-BS1)								Prepared & Analyzed: 05/28/2013			
1,1,1,2-Tetrachloroethane	50		ug/L	50.0		99.6	72-132				
1,1,1-Trichloroethane	50		"	50.0		99.1	77-131				
1,1,2,2-Tetrachloroethane	54		"	50.0		107	68-129				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	54		"	50.0		108	75-143				
1,1,2-Trichloroethane	51		"	50.0		103	72-128				
1,1-Dichloroethane	45		"	50.0		90.9	78-133				
1,1-Dichloroethylene	55		"	50.0		109	71-142				
1,1-Dichloropropylene	46		"	50.0		91.7	77-124				
1,2,3-Trichlorobenzene	55		"	50.0		110	65-134				
1,2,3-Trichloropropane	58		"	50.0		115	65-127				
1,2,4-Trichlorobenzene	53		"	50.0		107	59-133				
1,2,4-Trimethylbenzene	51		"	50.0		102	68-128				
1,2-Dibromo-3-chloropropane	53		"	50.0		106	58-145				
1,2-Dibromoethane	53		"	50.0		105	73-128				
1,2-Dichlorobenzene	50		"	50.0		99.4	69-126				
1,2-Dichloroethane	47		"	50.0		94.9	78-131				
1,2-Dichloropropane	51		"	50.0		101	72-129				
1,3,5-Trimethylbenzene	51		"	50.0		102	67-125				
1,3-Dichlorobenzene	51		"	50.0		101	67-125				
1,3-Dichloropropane	50		"	50.0		100	73-126				
1,4-Dichlorobenzene	50		"	50.0		99.6	67-127				
1,4-Dioxane	4.9		"	50.0		9.78	10-265	Low Bias			
2,2-Dichloropropane	47		"	50.0		93.9	68-133				
2-Butanone	49		"	50.0		97.8	49-138				
2-Chlorotoluene	50		"	50.0		101	61-121				
4-Chlorotoluene	51		"	50.0		101	65-126				
Acetone	40		"	50.0		80.8	21-131				
Benzene	51		"	50.0		102	81-125				
Bromobenzene	50		"	50.0		99.1	65-125				
Bromochloromethane	51		"	50.0		102	78-127				
Bromodichloromethane	53		"	50.0		107	73-131				
Bromoform	57		"	50.0		113	66-137				
Bromomethane	38		"	50.0		76.2	55-144				
Carbon tetrachloride	49		"	50.0		98.2	74-137				
Chlorobenzene	49		"	50.0		98.3	75-127				
Chloroethane	49		"	50.0		98.2	65-138				
Chloroform	50		"	50.0		99.0	82-128				
Chloromethane	42		"	50.0		84.0	51-138				
cis-1,2-Dichloroethylene	50		"	50.0		100	77-130				
cis-1,3-Dichloropropylene	53		"	50.0		106	68-123				
Dibromochloromethane	54		"	50.0		109	73-136				
Dibromomethane	54		"	50.0		108	75-131				
Dichlorodifluoromethane	28		"	50.0		55.1	10-183				
Ethyl Benzene	52		"	50.0		104	75-130				
Hexachlorobutadiene	46		"	50.0		92.0	59-130				
Isopropylbenzene	52		"	50.0		105	68-135				
Methyl tert-butyl ether (MTBE)	45		"	50.0		89.9	76-136				
Methylene chloride	56		"	50.0		112	55-143				
Naphthalene	65		"	50.0		130	65-140				
n-Butylbenzene	52		"	50.0		104	63-123				
n-Propylbenzene	53		"	50.0		106	65-127				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

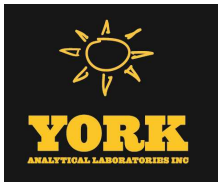
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31233 - EPA 5035A											
LCS (BE31233-BS1)								Prepared & Analyzed: 05/28/2013			
o-Xylene	49		ug/L	50.0		98.0	71-123				
p- & m- Xylenes	110		"	100		105	72-127				
p-Isopropyltoluene	51		"	50.0		103	69-128				
sec-Butylbenzene	54		"	50.0		108	69-125				
Styrene	51		"	50.0		102	74-127				
tert-Butylbenzene	52		"	50.0		103	59-164				
Tetrachloroethylene	49		"	50.0		98.8	65-151				
Toluene	51		"	50.0		103	72-127				
trans-1,2-Dichloroethylene	41		"	50.0		82.7	73-137				
trans-1,3-Dichloropropylene	51		"	50.0		102	67-131				
Trichloroethylene	51		"	50.0		101	73-129				
Trichlorofluoromethane	50		"	50.0		100	69-136				
Vinyl Chloride	44		"	50.0		87.3	58-132				
Vinyl acetate	44		"	50.0		87.5	10-84	High Bias			
Surrogate: 1,2-Dichloroethane-d4	*49.5*		*"*	*50.0*		*99.0*	*73-130*				
Surrogate: p-Bromofluorobenzene	*49.7*		*"*	*50.0*		*99.4*	*72-127*				
Surrogate: Toluene-d8	*51.1*		*"*	*50.0*		*102*	*84-117*				
LCS Dup (BE31233-BSD1)								Prepared: 05/28/2013 Analyzed: 05/29/2013			
1,1,1,2-Tetrachloroethane	51		ug/L	50.0		102	72-132		2.24	30	
1,1,1-Trichloroethane	51		"	50.0		103	77-131		3.53	30	
1,1,2,2-Tetrachloroethane	53		"	50.0		107	68-129		0.486	30	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	54		"	50.0		108	75-143		0.148	30	
1,1,2-Trichloroethane	51		"	50.0		102	72-128		1.09	30	
1,1-Dichloroethane	47		"	50.0		93.0	78-133		2.37	30	
1,1-Dichloroethylene	56		"	50.0		112	71-142		2.78	30	
1,1-Dichloropropylene	48		"	50.0		95.3	77-124		3.85	30	
1,2,3-Trichlorobenzene	56		"	50.0		113	65-134		2.67	30	
1,2,3-Trichloropropane	56		"	50.0		112	65-127		2.64	30	
1,2,4-Trichlorobenzene	55		"	50.0		109	59-133		2.46	30	
1,2,4-Trimethylbenzene	51		"	50.0		103	68-128		0.723	30	
1,2-Dibromo-3-chloropropane	53		"	50.0		107	58-145		0.563	30	
1,2-Dibromoethane	54		"	50.0		108	73-128		2.51	30	
1,2-Dichlorobenzene	50		"	50.0		101	69-126		1.48	30	
1,2-Dichloroethane	49		"	50.0		97.4	78-131		2.60	30	
1,2-Dichloropropane	52		"	50.0		104	72-129		2.69	30	
1,3,5-Trimethylbenzene	51		"	50.0		103	67-125		0.624	30	
1,3-Dichlorobenzene	51		"	50.0		102	67-125		0.473	30	
1,3-Dichloropropane	51		"	50.0		102	73-126		1.72	30	
1,4-Dichlorobenzene	51		"	50.0		101	67-127		1.75	30	
1,4-Dioxane	8.3		"	50.0		16.6	10-265		51.5	30	Non-dir.
2,2-Dichloropropane	49		"	50.0		97.6	68-133		3.84	30	
2-Butanone	49		"	50.0		98.3	49-138		0.510	30	
2-Chlorotoluene	50		"	50.0		100	61-121		0.318	30	
4-Chlorotoluene	51		"	50.0		102	65-126		0.374	30	
Acetone	41		"	50.0		81.3	21-131		0.666	30	
Benzene	52		"	50.0		104	81-125		2.70	30	
Bromobenzene	50		"	50.0		99.4	65-125		0.363	30	
Bromochloromethane	53		"	50.0		106	78-127		2.96	30	
Bromodichloromethane	54		"	50.0		109	73-131		1.85	30	
Bromoform	55		"	50.0		111	66-137		2.16	30	
Bromomethane	38		"	50.0		76.4	55-144		0.262	30	

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31233 - EPA 5035A											
LCS Dup (BE31233-BSD1)									Prepared: 05/28/2013 Analyzed: 05/29/2013		
Carbon tetrachloride	51		ug/L	50.0		103	74-137		4.36	30	
Chlorobenzene	51		"	50.0		102	75-127		3.85	30	
Chloroethane	51		"	50.0		102	65-138		3.42	30	
Chloroform	51		"	50.0		102	82-128		2.79	30	
Chloromethane	43		"	50.0		85.9	51-138		2.14	30	
cis-1,2-Dichloroethylene	52		"	50.0		105	77-130		4.04	30	
cis-1,3-Dichloropropylene	54		"	50.0		109	68-123		2.14	30	
Dibromochloromethane	55		"	50.0		109	73-136		0.441	30	
Dibromomethane	54		"	50.0		109	75-131		0.755	30	
Dichlorodifluoromethane	29		"	50.0		57.1	10-183		3.53	30	
Ethyl Benzene	54		"	50.0		108	75-130		3.30	30	
Hexachlorobutadiene	46		"	50.0		92.7	59-130		0.736	30	
Isopropylbenzene	52		"	50.0		104	68-135		0.287	30	
Methyl tert-butyl ether (MTBE)	58		"	50.0		116	76-136		25.6	30	
Methylene chloride	56		"	50.0		111	55-143		0.448	30	
Naphthalene	66		"	50.0		132	65-140		1.10	30	
n-Butylbenzene	53		"	50.0		106	63-123		1.56	30	
n-Propylbenzene	54		"	50.0		107	65-127		1.14	30	
o-Xylene	50		"	50.0		101	71-123		2.80	30	
p- & m- Xylenes	110		"	100		109	72-127		3.42	30	
p-Isopropyltoluene	52		"	50.0		105	69-128		1.81	30	
sec-Butylbenzene	54		"	50.0		108	69-125		0.00	30	
Styrene	52		"	50.0		104	74-127		2.57	30	
tert-Butylbenzene	51		"	50.0		103	59-164		0.407	30	
Tetrachloroethylene	53		"	50.0		105	65-151		6.46	30	
Toluene	53		"	50.0		106	72-127		2.66	30	
trans-1,2-Dichloroethylene	54		"	50.0		107	73-137		25.8	30	
trans-1,3-Dichloropropylene	52		"	50.0		103	67-131		1.30	30	
Trichloroethylene	52		"	50.0		103	73-129		1.99	30	
Trichlorofluoromethane	50		"	50.0		101	69-136		0.199	30	
Vinyl Chloride	43		"	50.0		86.8	58-132		0.643	30	
Vinyl acetate	46		"	50.0		91.2	10-84	High Bias	4.16	30	
Surrogate: 1,2-Dichloroethane-d4	*49.9*		*"*	*50.0*		*99.8*	*73-130*				
Surrogate: p-Bromofluorobenzene	*49.8*		*"*	*50.0*		*99.7*	*72-127*				
Surrogate: Toluene-d8	*51.4*		*"*	*50.0*		*103*	*84-117*				



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

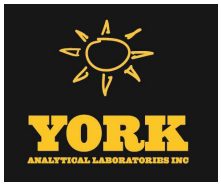
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31117 - EPA 3550B											
Blank (BE31117-BLK1)											
Prepared & Analyzed: 05/24/2013											
Acenaphthene	ND	0.167	mg/kg wet								
Acenaphthylene	ND	0.167	"								
Aniline	ND	0.167	"								
Anthracene	ND	0.167	"								
Benzo(a)anthracene	ND	0.167	"								
Benzo(a)pyrene	ND	0.167	"								
Benzo(b)fluoranthene	ND	0.167	"								
Benzo(g,h,i)perylene	ND	0.167	"								
Benzyl alcohol	ND	0.167	"								
Benzo(k)fluoranthene	ND	0.167	"								
Benzyl butyl phthalate	ND	0.167	"								
4-Bromophenyl phenyl ether	ND	0.167	"								
4-Chloro-3-methylphenol	ND	0.167	"								
4-Chloroaniline	ND	0.167	"								
Bis(2-chloroethoxy)methane	ND	0.167	"								
Bis(2-chloroethyl)ether	ND	0.167	"								
Bis(2-chloroisopropyl)ether	ND	0.167	"								
Bis(2-ethylhexyl)phthalate	ND	0.167	"								
2-Chloronaphthalene	ND	0.167	"								
2-Chlorophenol	ND	0.167	"								
4-Chlorophenyl phenyl ether	ND	0.167	"								
Chrysene	ND	0.167	"								
Dibenzo(a,h)anthracene	ND	0.167	"								
Dibenzofuran	ND	0.167	"								
Di-n-butyl phthalate	ND	0.167	"								
1,2-Dichlorobenzene	ND	0.167	"								
1,4-Dichlorobenzene	ND	0.167	"								
1,3-Dichlorobenzene	ND	0.167	"								
3,3'-Dichlorobenzidine	ND	0.167	"								
2,4-Dichlorophenol	ND	0.167	"								
Diethyl phthalate	ND	0.167	"								
2,4-Dimethylphenol	ND	0.167	"								
Dimethyl phthalate	ND	0.167	"								
2-Nitroaniline	ND	0.167	"								
4,6-Dinitro-2-methylphenol	ND	0.333	"								
2,4-Dinitrophenol	ND	0.333	"								
2,6-Dinitrotoluene	ND	0.167	"								
2,4-Dinitrotoluene	ND	0.167	"								
Di-n-octyl phthalate	ND	0.167	"								
Fluoranthene	ND	0.167	"								
Fluorene	ND	0.167	"								
Hexachlorobenzene	ND	0.167	"								
Hexachlorobutadiene	ND	0.167	"								
Hexachlorocyclopentadiene	ND	0.167	"								
Hexachloroethane	ND	0.167	"								
Indeno(1,2,3-cd)pyrene	ND	0.167	"								
Isophorone	ND	0.167	"								
2-Methylnaphthalene	ND	0.167	"								
2-Methylphenol	ND	0.167	"								
3- & 4-Methylphenols	ND	0.167	"								
Naphthalene	ND	0.167	"								

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

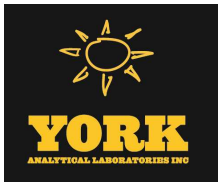
Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31117 - EPA 3550B											
Blank (BE31117-BLK1)								Prepared & Analyzed: 05/24/2013			
3-Nitroaniline	ND	0.167	mg/kg wet								
4-Nitroaniline	ND	0.167	"								
Nitrobenzene	ND	0.167	"								
4-Nitrophenol	ND	0.167	"								
2-Nitrophenol	ND	0.167	"								
N-nitroso-di-n-propylamine	ND	0.167	"								
N-Nitrosodimethylamine	ND	0.167	"								
N-Nitrosodiphenylamine	ND	0.167	"								
Pentachlorophenol	ND	0.167	"								
Phenanthrene	ND	0.167	"								
Phenol	ND	0.167	"								
Pyrene	ND	0.167	"								
Pyridine	ND	0.167	"								
1,2,4-Trichlorobenzene	ND	0.167	"								
2,4,5-Trichlorophenol	ND	0.167	"								
2,4,6-Trichlorophenol	ND	0.167	"								
Surrogate: 2,4,6-Tribromophenol	*2.60*		*"*	*2.50*		*104*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*1.16*		*"*	*1.67*		*69.7*	*30-130*				
Surrogate: 2-Fluorophenol	*1.58*		*"*	*2.50*		*63.3*	*15-110*				
Surrogate: Nitrobenzene-d5	*1.12*		*"*	*1.67*		*67.0*	*30-130*				
Surrogate: Phenol-d5	*1.60*		*"*	*2.50*		*63.9*	*15-110*				
Surrogate: Terphenyl-d14	*1.67*		*"*	*1.67*		*100*	*30-130*				
LCS (BE31117-BS1)								Prepared & Analyzed: 05/24/2013			
Acenaphthene	1.23	0.167	mg/kg wet	1.67		74.0	31.1-109				
Acenaphthylene	1.15	0.167	"	1.67		69.3	31.1-106				
Aniline	1.33	0.167	"	1.67		79.9	5.07-149				
Anthracene	1.13	0.167	"	1.67		67.6	31.5-107				
Benzo(a)anthracene	1.38	0.167	"	1.67		82.8	31.5-115				
Benzo(a)pyrene	1.42	0.167	"	1.67		84.9	29.1-138				
Benzo(b)fluoranthene	1.35	0.167	"	1.67		80.8	14.9-131				
Benzo(g,h,i)perylene	1.45	0.167	"	1.67		86.8	6.56-121				
Benzyl alcohol	1.27	0.167	"	1.67		76.5	25.4-119				
Benzo(k)fluoranthene	1.33	0.167	"	1.67		79.8	29.1-121				
Benzyl butyl phthalate	1.41	0.167	"	1.67		84.8	31.3-112				
4-Bromophenyl phenyl ether	1.17	0.167	"	1.67		70.3	25.2-113				
4-Chloro-3-methylphenol	1.23	0.167	"	1.67		73.6	29.5-124				
4-Chloroaniline	1.62	0.167	"	1.67		97.0	10-177				
Bis(2-chloroethoxy)methane	1.24	0.167	"	1.67		74.1	27.9-111				
Bis(2-chloroethyl)ether	1.24	0.167	"	1.67		74.1	18-122				
Bis(2-chloroisopropyl)ether	1.22	0.167	"	1.67		72.9	9.62-123				
Bis(2-ethylhexyl)phthalate	1.32	0.167	"	1.67		79.0	25-105				
2-Chloronaphthalene	1.05	0.167	"	1.67		63.1	31.7-108				
2-Chlorophenol	1.24	0.167	"	1.67		74.7	20.3-125				
4-Chlorophenyl phenyl ether	1.13	0.167	"	1.67		67.8	23.6-110				
Chrysene	1.43	0.167	"	1.67		85.6	27.4-117				
Dibenzo(a,h)anthracene	1.38	0.167	"	1.67		82.6	14.6-119				
Dibenzofuran	1.24	0.167	"	1.67		74.1	30.2-108				
Di-n-butyl phthalate	1.22	0.167	"	1.67		73.1	33.5-100				
1,2-Dichlorobenzene	1.25	0.167	"	1.67		75.0	22.8-114				
1,4-Dichlorobenzene	1.19	0.167	"	1.67		71.5	19.8-121				



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31117 - EPA 3550B											
LCS (BE31117-BS1)							Prepared & Analyzed: 05/24/2013				
1,3-Dichlorobenzene	1.26	0.167	mg/kg wet	1.67		75.6	20.6-119				
3,3'-Dichlorobenzidine	1.81	0.167	"	1.67		109	10-180				
2,4-Dichlorophenol	1.17	0.167	"	1.67		70.0	23.3-125				
Diethyl phthalate	1.29	0.167	"	1.67		77.6	29.7-111				
2,4-Dimethylphenol	1.13	0.167	"	1.67		67.9	29.8-115				
Dimethyl phthalate	1.32	0.167	"	1.67		79.5	27-118				
2-Nitroaniline	1.18	0.167	"	1.67		70.6	40-140				
4,6-Dinitro-2-methylphenol	1.51	0.333	"	1.67		90.6	10-122				
2,4-Dinitrophenol	1.97	0.333	"	1.67		118	10-151				
2,6-Dinitrotoluene	1.19	0.167	"	1.67		71.4	26.1-119				
2,4-Dinitrotoluene	1.34	0.167	"	1.67		80.2	21.4-126				
Di-n-octyl phthalate	1.08	0.167	"	1.67		64.5	19-129				
Fluoranthene	1.17	0.167	"	1.67		70.2	31.3-110				
Fluorene	1.15	0.167	"	1.67		69.1	29.9-108				
Hexachlorobenzene	1.15	0.167	"	1.67		68.8	31.7-102				
Hexachlorobutadiene	1.21	0.167	"	1.67		72.6	10.1-134				
Hexachlorocyclopentadiene	1.13	0.167	"	1.67		67.8	10-122				
Hexachloroethane	1.23	0.167	"	1.67		73.8	20.2-114				
Indeno(1,2,3-cd)pyrene	1.46	0.167	"	1.67		87.4	12.6-120				
Isophorone	1.26	0.167	"	1.67		75.7	27.2-113				
2-Methylnaphthalene	1.18	0.167	"	1.67		70.9	17.4-119				
2-Methylphenol	1.64	0.167	"	1.67		98.6	23.6-125				
3- & 4-Methylphenols	1.14	0.167	"	1.67		68.2	21.3-115				
Naphthalene	1.17	0.167	"	1.67		70.2	25.2-111				
3-Nitroaniline	1.46	0.167	"	1.67		87.5	9.73-147				
4-Nitroaniline	1.57	0.167	"	1.67		94.3	6.42-169				
Nitrobenzene	1.15	0.167	"	1.67		68.9	21.8-118				
4-Nitrophenol	1.51	0.167	"	1.67		90.8	10-136				
2-Nitrophenol	1.09	0.167	"	1.67		65.7	20.6-119				
N-nitroso-di-n-propylamine	1.27	0.167	"	1.67		76.3	25.3-118				
N-Nitrosodimethylamine	1.33	0.167	"	1.67		80.0	10-142				
N-Nitrosodiphenylamine	1.29	0.167	"	1.67		77.6	35.8-132				
Pentachlorophenol	1.38	0.167	"	1.67		83.0	3.68-146				
Phenanthrene	1.17	0.167	"	1.67		70.0	31.2-105				
Phenol	1.11	0.167	"	1.67		66.7	23.2-117				
Pyrene	1.29	0.167	"	1.67		77.5	26.3-124				
Pyridine	0.438	0.167	"	1.67		26.3	10-122				
1,2,4-Trichlorobenzene	1.23	0.167	"	1.67		73.6	19.3-128				
2,4,5-Trichlorophenol	1.13	0.167	"	1.67		67.8	19.5-131				
2,4,6-Trichlorophenol	1.19	0.167	"	1.67		71.5	24.2-123				
Surrogate: 2,4,6-Tribromophenol	*1.62*		*"*	*2.50*		*64.9*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*0.951*		*"*	*1.67*		*56.9*	*30-130*				
Surrogate: 2-Fluorophenol	*1.64*		*"*	*2.50*		*65.8*	*15-110*				
Surrogate: Nitrobenzene-d5	*1.12*		*"*	*1.67*		*67.0*	*30-130*				
Surrogate: Phenol-d5	*1.62*		*"*	*2.50*		*64.5*	*15-110*				
Surrogate: Terphenyl-d14	*1.13*		*"*	*1.67*		*68.0*	*30-130*				



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31117 - EPA 3550B											
LCS Dup (BE31117-BSD1)							Prepared & Analyzed: 05/24/2013				
Acenaphthene	1.57	0.167	mg/kg wet	1.67		94.1	31.1-109		23.9	30	
Acenaphthylene	1.43	0.167	"	1.67		85.9	31.1-106		21.4	30	
Aniline	1.70	0.167	"	1.67		102	5.07-149		24.2	30	
Anthracene	1.39	0.167	"	1.67		83.5	31.5-107		21.0	30	
Benzo(a)anthracene	1.58	0.167	"	1.67		94.9	31.5-115		13.7	30	
Benzo(a)pyrene	1.67	0.167	"	1.67		100	29.1-138		16.6	30	
Benzo(b)fluoranthene	1.64	0.167	"	1.67		98.2	14.9-131		19.4	30	
Benzo(g,h,i)perylene	1.69	0.167	"	1.67		102	6.56-121		15.8	30	
Benzyl alcohol	1.65	0.167	"	1.67		99.1	25.4-119		25.7	30	
Benzo(k)fluoranthene	1.41	0.167	"	1.67		84.8	29.1-121		6.07	30	
Benzyl butyl phthalate	1.77	0.167	"	1.67		106	31.3-112		22.6	30	
4-Bromophenyl phenyl ether	1.33	0.167	"	1.67		79.8	25.2-113		12.8	30	
4-Chloro-3-methylphenol	1.53	0.167	"	1.67		91.7	29.5-124		21.9	30	
4-Chloroaniline	1.77	0.167	"	1.67		106	10-177		9.15	30	
Bis(2-chloroethoxy)methane	1.47	0.167	"	1.67		88.1	27.9-111		17.3	30	
Bis(2-chloroethyl)ether	1.48	0.167	"	1.67		88.6	18-122		17.8	30	
Bis(2-chloroisopropyl)ether	1.48	0.167	"	1.67		88.8	9.62-123		19.7	30	
Bis(2-ethylhexyl)phthalate	1.49	0.167	"	1.67		89.4	25-105		12.3	30	
2-Chloronaphthalene	1.46	0.167	"	1.67		87.3	31.7-108		32.3	30	Non-dir.
2-Chlorophenol	1.60	0.167	"	1.67		95.9	20.3-125		24.9	30	
4-Chlorophenyl phenyl ether	1.40	0.167	"	1.67		84.1	23.6-110		21.4	30	
Chrysene	1.68	0.167	"	1.67		101	27.4-117		16.1	30	
Dibenzo(a,h)anthracene	1.62	0.167	"	1.67		96.9	14.6-119		16.0	30	
Dibenzofuran	1.53	0.167	"	1.67		91.8	30.2-108		21.3	30	
Di-n-butyl phthalate	1.40	0.167	"	1.67		83.7	33.5-100		13.5	30	
1,2-Dichlorobenzene	1.60	0.167	"	1.67		96.0	22.8-114		24.7	30	
1,4-Dichlorobenzene	1.56	0.167	"	1.67		93.8	19.8-121		26.9	30	
1,3-Dichlorobenzene	1.57	0.167	"	1.67		94.1	20.6-119		21.8	30	
3,3'-Dichlorobenzidine	1.94	0.167	"	1.67		117	10-180		6.90	30	
2,4-Dichlorophenol	1.46	0.167	"	1.67		87.7	23.3-125		22.5	30	
Diethyl phthalate	1.56	0.167	"	1.67		93.6	29.7-111		18.7	30	
2,4-Dimethylphenol	1.44	0.167	"	1.67		86.3	29.8-115		23.8	30	
Dimethyl phthalate	1.73	0.167	"	1.67		104	27-118		26.4	30	
2-Nitroaniline	1.75	0.167	"	1.67		105	40-140		39.1	30	Non-dir.
4,6-Dinitro-2-methylphenol	1.80	0.333	"	1.67		108	10-122		17.6	30	
2,4-Dinitrophenol	2.98	0.333	"	1.67		179	10-151	High Bias	40.8	30	Non-dir.
2,6-Dinitrotoluene	1.47	0.167	"	1.67		88.3	26.1-119		21.1	30	
2,4-Dinitrotoluene	1.72	0.167	"	1.67		103	21.4-126		25.3	30	
Di-n-octyl phthalate	1.26	0.167	"	1.67		75.4	19-129		15.5	30	
Fluoranthene	1.38	0.167	"	1.67		83.1	31.3-110		16.8	30	
Fluorene	1.40	0.167	"	1.67		84.1	29.9-108		19.6	30	
Hexachlorobenzene	1.38	0.167	"	1.67		82.6	31.7-102		18.3	30	
Hexachlorobutadiene	1.46	0.167	"	1.67		87.4	10.1-134		18.6	30	
Hexachlorocyclopentadiene	1.46	0.167	"	1.67		87.6	10-122		25.4	30	
Hexachloroethane	1.54	0.167	"	1.67		92.2	20.2-114		22.2	30	
Indeno(1,2,3-cd)pyrene	1.70	0.167	"	1.67		102	12.6-120		15.5	30	
Isophorone	1.63	0.167	"	1.67		97.6	27.2-113		25.3	30	
2-Methylnaphthalene	1.43	0.167	"	1.67		85.6	17.4-119		18.9	30	
2-Methylphenol	2.03	0.167	"	1.67		122	23.6-125		21.2	30	
3- & 4-Methylphenols	1.45	0.167	"	1.67		87.1	21.3-115		24.4	30	
Naphthalene	1.38	0.167	"	1.67		82.5	25.2-111		16.1	30	

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31117 - EPA 3550B											
LCS Dup (BE31117-BSD1)								Prepared & Analyzed: 05/24/2013			
3-Nitroaniline	1.97	0.167	mg/kg wet	1.67		118	9.73-147		30.0	30	
4-Nitroaniline	2.54	0.167	"	1.67		152	6.42-169		47.2	30	Non-dir.
Nitrobenzene	1.46	0.167	"	1.67		87.4	21.8-118		23.7	30	
4-Nitrophenol	2.19	0.167	"	1.67		132	10-136		36.7	30	Non-dir.
2-Nitrophenol	1.45	0.167	"	1.67		87.2	20.6-119		28.1	30	
N-nitroso-di-n-propylamine	1.81	0.167	"	1.67		109	25.3-118		34.9	30	Non-dir.
N-Nitrosodimethylamine	1.74	0.167	"	1.67		104	10-142		26.3	30	
N-Nitrosodiphenylamine	1.49	0.167	"	1.67		89.4	35.8-132		14.2	30	
Pentachlorophenol	1.78	0.167	"	1.67		107	3.68-146		25.1	30	
Phenanthrene	1.34	0.167	"	1.67		80.4	31.2-105		13.9	30	
Phenol	1.31	0.167	"	1.67		78.8	23.2-117		16.7	30	
Pyrene	1.61	0.167	"	1.67		96.9	26.3-124		22.2	30	
Pyridine	0.664	0.167	"	1.67		39.9	10-122		41.1	30	Non-dir.
1,2,4-Trichlorobenzene	1.41	0.167	"	1.67		84.4	19.3-128		13.6	30	
2,4,5-Trichlorophenol	1.59	0.167	"	1.67		95.4	19.5-131		33.8	30	Non-dir.
2,4,6-Trichlorophenol	1.61	0.167	"	1.67		96.3	24.2-123		29.7	30	
Surrogate: 2,4,6-Tribromophenol	*1.97*		*"*	*2.50*		*78.7*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*1.24*		*"*	*1.67*		*74.5*	*30-130*				
Surrogate: 2-Fluorophenol	*2.19*		*"*	*2.50*		*87.5*	*15-110*				
Surrogate: Nitrobenzene-d5	*1.37*		*"*	*1.67*		*82.3*	*30-130*				
Surrogate: Phenol-d5	*2.04*		*"*	*2.50*		*81.6*	*15-110*				
Surrogate: Terphenyl-d14	*1.40*		*"*	*1.67*		*84.1*	*30-130*				

Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31116 - EPA 3550B											
Blank (BE31116-BLK1)											
Prepared: 05/24/2013 Analyzed: 05/28/2013											
Toxaphene	ND	0.0167	mg/kg wet								
Methoxychlor	ND	0.00165	"								
Heptachlor epoxide	ND	0.000330	"								
Heptachlor	ND	0.000330	"								
gamma-BHC (Lindane)	ND	0.000330	"								
Endrin ketone	ND	0.000330	"								
Endrin aldehyde	ND	0.000330	"								
Endrin	ND	0.000330	"								
Endosulfan sulfate	ND	0.000330	"								
Endosulfan II	ND	0.000330	"								
Endosulfan I	ND	0.000330	"								
Dieldrin	ND	0.000330	"								
delta-BHC	ND	0.000330	"								
Chlordane, total	ND	0.00132	"								
beta-BHC	ND	0.000330	"								
alpha-BHC	ND	0.000330	"								
Aldrin	ND	0.000330	"								
4,4'-DDT	ND	0.000330	"								
4,4'-DDE	ND	0.000330	"								
4,4'-DDD	ND	0.000330	"								
Aroclor 1260	ND	0.0170	"								
Aroclor 1254	ND	0.0170	"								
Aroclor 1248	ND	0.0170	"								
Aroclor 1242	ND	0.0170	"								
Aroclor 1232	ND	0.0170	"								
Aroclor 1221	ND	0.0170	"								
Aroclor 1016	ND	0.0170	"								
Total PCBs	ND	0.0170	"								
Surrogate: Tetrachloro-m-xylene	*0.0683*		"	*0.0667*		*102*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0604*		"	*0.0670*		*90.1*	*30-150*				

Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31116 - EPA 3550B											
LCS (BE31116-BS1)								Prepared: 05/24/2013 Analyzed: 05/28/2013			
Methoxychlor	0.0340	0.00165	mg/kg wet	0.0333		102	40-140				
Heptachlor epoxide	0.0296	0.000330	"	0.0333		88.9	40-140				
Heptachlor	0.0290	0.000330	"	0.0333		86.9	40-140				
gamma-BHC (Lindane)	0.0303	0.000330	"	0.0333		91.0	40-140				
Endrin ketone	0.0270	0.000330	"	0.0333		80.9	40-140				
Endrin aldehyde	0.0281	0.000330	"	0.0333		84.2	40-140				
Endrin	0.0309	0.000330	"	0.0333		92.8	40-140				
Endosulfan sulfate	0.0290	0.000330	"	0.0333		87.0	40-140				
Endosulfan II	0.0294	0.000330	"	0.0333		88.3	40-140				
Endosulfan I	0.0311	0.000330	"	0.0333		93.3	40-140				
Dieldrin	0.0296	0.000330	"	0.0333		88.7	40-140				
delta-BHC	0.0313	0.000330	"	0.0333		94.0	40-140				
beta-BHC	0.0305	0.000330	"	0.0333		91.4	40-140				
alpha-BHC	0.0316	0.000330	"	0.0333		94.8	40-140				
Aldrin	0.0308	0.000330	"	0.0333		92.4	40-140				
4,4'-DDT	0.0354	0.000330	"	0.0333		106	40-140				
4,4'-DDE	0.0294	0.000330	"	0.0333		88.2	40-140				
4,4'-DDD	0.0323	0.000330	"	0.0333		97.0	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0612*		*"*	*0.0667*		*91.7*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0551*		*"*	*0.0670*		*82.2*	*30-150*				
LCS (BE31116-BS2)								Prepared: 05/24/2013 Analyzed: 05/28/2013			
Aroclor 1260	0.296	0.0170	mg/kg wet	0.333		88.7	40-140				
Aroclor 1016	0.322	0.0170	"	0.333		96.6	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0587*		*"*	*0.0667*		*88.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0557*		*"*	*0.0670*		*83.1*	*30-150*				
LCS Dup (BE31116-BSD1)								Prepared: 05/24/2013 Analyzed: 05/28/2013			
Methoxychlor	0.0349	0.00165	mg/kg wet	0.0333		105	40-140		2.65	200	
Heptachlor epoxide	0.0300	0.000330	"	0.0333		89.9	40-140		1.15	200	
Heptachlor	0.0295	0.000330	"	0.0333		88.6	40-140		1.98	200	
gamma-BHC (Lindane)	0.0308	0.000330	"	0.0333		92.3	40-140		1.50	200	
Endrin ketone	0.0274	0.000330	"	0.0333		82.3	40-140		1.73	200	
Endrin aldehyde	0.0287	0.000330	"	0.0333		86.0	40-140		2.09	200	
Endrin	0.0314	0.000330	"	0.0333		94.1	40-140		1.44	200	
Endosulfan sulfate	0.0293	0.000330	"	0.0333		88.0	40-140		1.23	200	
Endosulfan II	0.0298	0.000330	"	0.0333		89.3	40-140		1.12	200	
Endosulfan I	0.0314	0.000330	"	0.0333		94.3	40-140		1.04	200	
Dieldrin	0.0298	0.000330	"	0.0333		89.3	40-140		0.749	200	
delta-BHC	0.0319	0.000330	"	0.0333		95.7	40-140		1.76	200	
beta-BHC	0.0309	0.000330	"	0.0333		92.7	40-140		1.39	200	
alpha-BHC	0.0319	0.000330	"	0.0333		95.8	40-140		1.06	200	
Aldrin	0.0312	0.000330	"	0.0333		93.6	40-140		1.27	200	
4,4'-DDT	0.0336	0.000330	"	0.0333		101	40-140		5.19	200	
4,4'-DDE	0.0298	0.000330	"	0.0333		89.4	40-140		1.41	200	
4,4'-DDD	0.0329	0.000330	"	0.0333		98.6	40-140		1.58	200	
Surrogate: Tetrachloro-m-xylene	*0.0615*		*"*	*0.0667*		*92.2*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0559*		*"*	*0.0670*		*83.4*	*30-150*				

Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31116 - EPA 3550B											
Matrix Spike (BE31116-MS1)	*Source sample: 13E0744-11 (DUP-1 (052113))										Prepared: 05/24/2013 Analyzed: 05/28/2013
Methoxychlor	0.0391	0.00956	mg/kg dry	0.0386	ND	101	30-150				
Heptachlor epoxide	0.0340	0.00191	"	0.0386	ND	87.9	30-150				
Heptachlor	0.0322	0.00191	"	0.0386	ND	83.4	30-150				
gamma-BHC (Lindane)	0.0375	0.00191	"	0.0386	ND	97.1	30-150				
Endrin ketone	0.0367	0.00191	"	0.0386	ND	94.9	30-150				
Endrin aldehyde	0.0338	0.00191	"	0.0386	ND	87.4	30-150				
Endrin	0.0368	0.00191	"	0.0386	ND	95.1	30-150				
Endosulfan sulfate	0.0351	0.00191	"	0.0386	ND	90.8	30-150				
Endosulfan II	0.0335	0.00191	"	0.0386	ND	86.7	30-150				
Endosulfan I	0.0346	0.00191	"	0.0386	ND	89.7	30-150				
Dieldrin	0.0336	0.00191	"	0.0386	ND	86.9	30-150				
delta-BHC	0.0320	0.00191	"	0.0386	ND	82.8	30-150				
beta-BHC	0.0354	0.00191	"	0.0386	ND	91.6	30-150				
alpha-BHC	0.0368	0.00191	"	0.0386	ND	95.2	30-150				
Aldrin	0.0297	0.00191	"	0.0386	ND	76.8	30-150				
4,4'-DDT	0.0313	0.00191	"	0.0386	ND	80.9	30-150				
4,4'-DDE	0.0296	0.00191	"	0.0386	ND	76.7	30-150				
4,4'-DDD	0.0321	0.00191	"	0.0386	ND	83.0	30-150				
Surrogate: Tetrachloro-m-xylene	*0.0460*		*"*	*0.0773*		*59.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0358*		*"*	*0.0777*		*46.1*	*30-150*				

Polychlorinated Biphenyls (PCB) by EPA SW 846-8082/EPA Compendium Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31118 - EPA 3550B											
Blank (BE31118-BLK1)											Prepared: 05/24/2013 Analyzed: 05/28/2013
Aroclor 1016	ND	0.0170	mg/kg wet								
Aroclor 1221	ND	0.0170	"								
Aroclor 1232	ND	0.0170	"								
Aroclor 1242	ND	0.0170	"								
Aroclor 1248	ND	0.0170	"								
Aroclor 1254	ND	0.0170	"								
Aroclor 1260	ND	0.0170	"								
Total PCBs	ND	0.0170	"								
Surrogate: Tetrachloro-m-xylene	*0.0517*		*"*	*0.0667*		*77.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0533*		*"*	*0.0670*		*79.6*	*30-150*				
LCS (BE31118-BS1)											Prepared: 05/24/2013 Analyzed: 05/28/2013
Aroclor 1016	0.267	0.0170	mg/kg wet	0.333		80.0	40-140				
Aroclor 1260	0.259	0.0170	"	0.333		77.7	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0523*		*"*	*0.0667*		*78.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0547*		*"*	*0.0670*		*81.6*	*30-150*				
LCS Dup (BE31118-BSD1)											Prepared: 05/24/2013 Analyzed: 05/28/2013
Aroclor 1016	0.284	0.0170	mg/kg wet	0.333		85.1	40-140		6.20	25	
Aroclor 1260	0.277	0.0170	"	0.333		83.2	40-140		6.83	25	
Surrogate: Tetrachloro-m-xylene	*0.0570*		*"*	*0.0667*		*85.5*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0610*		*"*	*0.0670*		*91.0*	*30-150*				
Matrix Spike (BE31118-MS1)	*Source sample: 13E0744-02 (MW-5 (6-8))										Prepared: 05/24/2013 Analyzed: 05/28/2013
Aroclor 1016	0.293	0.0189	mg/kg dry	0.370	ND	79.2	40-140				
Aroclor 1260	0.271	0.0189	"	0.370	ND	73.3	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0444*		*"*	*0.0741*		*60.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.0437*		*"*	*0.0744*		*58.7*	*30-150*				

Metals by EPA 6000 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31111 - EPA 3050B											
Blank (BE31111-BLK1)									Prepared & Analyzed: 05/23/2013		
Aluminum	ND	2.00	mg/kg wet								
Antimony	ND	0.500	"								
Arsenic	ND	1.00	"								
Barium	ND	0.500	"								
Beryllium	ND	0.100	"								
Cadmium	ND	0.500	"								
Calcium	ND	5.00	"								
Chromium	ND	0.500	"								
Cobalt	ND	0.500	"								
Copper	ND	0.500	"								
Iron	ND	2.00	"								
Lead	ND	0.300	"								
Magnesium	ND	5.00	"								
Manganese	ND	1.00	"								
Nickel	ND	0.500	"								
Potassium	ND	10.0	"								
Selenium	ND	0.500	"								
Silver	ND	0.500	"								
Sodium	13.0	10.0	"								
Thallium	ND	0.500	"								
Vanadium	ND	0.500	"								
Zinc	ND	0.500	"								
Duplicate (BE31111-DUP1)	*Source sample: 13E0744-10 (LG-19 (26-28))								Prepared & Analyzed: 05/23/2013		
Aluminum	7140	2.26	mg/kg dry		7220				1.02	35	
Antimony	ND	0.565	"		ND					35	
Arsenic	1.36	1.13	"		1.22				10.4	35	
Barium	45.5	0.565	"		45.2				0.541	35	
Beryllium	ND	0.113	"		ND					35	
Cadmium	ND	0.565	"		ND					35	
Calcium	1150	5.65	"		1170				1.21	35	
Chromium	12.2	0.565	"		12.2				0.0215	35	
Cobalt	6.42	0.565	"		6.37				0.643	35	
Copper	10.8	0.565	"		10.8				0.307	35	
Iron	10100	2.26	"		10200				1.10	35	
Lead	3.85	0.339	"		3.74				2.97	35	
Magnesium	1920	5.65	"		1950				1.62	35	
Manganese	200	1.13	"		202				0.774	35	
Nickel	14.4	0.565	"		14.0				2.53	35	
Potassium	986	11.3	"		1000				1.87	35	
Selenium	0.680	0.565	"		0.671				1.39	35	
Silver	ND	0.565	"		ND					35	
Sodium	183	11.3	"		183				0.281	35	
Thallium	ND	0.565	"		ND					35	
Vanadium	14.5	0.565	"		14.5				0.203	35	
Zinc	23.0	0.565	"		23.1				0.406	35	

Metals by EPA 6000 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31111 - EPA 3050B											
Matrix Spike (BE31111-MS1)	*Source sample: 13E0744-10 (LG-19 (26-28))							Prepared & Analyzed: 05/23/2013			
Aluminum	7420	2.26	mg/kg dry	226	7220	88.1	75-125				
Antimony	29.3	0.565	"	28.3	ND	104	75-125				
Arsenic	223	1.13	"	226	1.22	98.0	75-125				
Barium	272	0.565	"	226	45.2	100	75-125				
Beryllium	4.79	0.113	"	5.65	ND	84.7	75-125				
Cadmium	5.53	0.565	"	5.65	ND	97.7	75-125				
Chromium	35.8	0.565	"	22.6	12.2	104	75-125				
Cobalt	64.5	0.565	"	56.5	6.37	103	75-125				
Copper	40.1	0.565	"	28.3	10.8	104	75-125				
Iron	10200	2.26	"	113	10200	51.7	75-125	Low Bias			
Lead	59.8	0.339	"	56.5	3.74	99.2	75-125				
Magnesium	1940	5.65	"		1950		75-125				
Manganese	257	1.13	"	56.5	202	97.1	75-125				
Nickel	72.2	0.565	"	56.5	14.0	103	75-125				
Potassium	988	11.3	"		1000		75-125				
Silver	4.08	0.565	"	5.65	ND	72.2	75-125	Low Bias			
Sodium	179	11.3	"		183		75-125				
Thallium	229	0.565	"	226	ND	101	75-125				
Vanadium	68.2	0.565	"	56.5	14.5	95.0	75-125				
Zinc	80.9	0.565	"	56.5	23.1	102	75-125				
Reference (BE31111-SRM1)								Prepared & Analyzed: 05/23/2013			
Aluminum	8040	2.00	mg/kg wet	8360		96.2	40.4-159				
Antimony	128	0.500	"	92.9		137	24.8-272				
Arsenic	89.1	1.00	"	94.5		94.3	69.2-131				
Barium	154	0.500	"	166		92.5	72.9-127				
Beryllium	49.7	0.100	"	52.6		94.5	73-127				
Cadmium	54.6	0.500	"	59.9		91.1	73.1-127				
Calcium	5720	5.00	"	6160		92.9	73.9-126				
Chromium	65.1	0.500	"	69.3		93.9	68.4-132				
Cobalt	98.4	0.500	"	101		97.4	74.2-125				
Copper	76.6	0.500	"	78.0		98.2	73.6-126				
Iron	13000	2.00	"	12800		102	31.8-168				
Lead	82.9	0.300	"	91.7		90.4	70.2-130				
Magnesium	2760	5.00	"	3030		91.2	66-134				
Manganese	262	1.00	"	283		92.6	73.9-125				
Nickel	60.3	0.500	"	56.6		107	70-130				
Potassium	3510	10.0	"	3820		91.9	64.7-136				
Selenium	152	0.500	"	159		95.9	67.9-133				
Silver	30.3	0.500	"	33.9		89.5	65.5-135				
Sodium	709	10.0	"	652		109	55.1-145				
Thallium	109	0.500	"	119		91.3	67.6-133				
Vanadium	53.8	0.500	"	56.3		95.5	53.3-147				
Zinc	132	0.500	"	137		96.0	67.4-133				

Mercury by EPA 7000/200 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31145 - EPA SW846-7471											
Blank (BE31145-BLK1)									Prepared & Analyzed: 05/24/2013		
Mercury	ND	0.0330	mg/kg wet								
LCS (BE31145-BS1)									Prepared & Analyzed: 05/24/2013		
Mercury	3.73		mg/kg	3.73		100	67.6-131				
Duplicate (BE31145-DUP2)	*Source sample: 13E0744-01 (MW-5 (0-2))								Prepared & Analyzed: 05/24/2013		
Mercury	ND	0.0386	mg/kg dry		ND					35	
Matrix Spike (BE31145-MS2)	*Source sample: 13E0744-01 (MW-5 (0-2))								Prepared & Analyzed: 05/24/2013		
Mercury	0.350		mg/kg	0.333	ND	105	75-125				

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
13E0744-01	MW-5 (0-2)	Encore Sampler
13E0744-02	MW-5 (6-8)	Encore Sampler
13E0744-03	LG-20 (0-2)	Encore Sampler
13E0744-04	LG-20 (22-24)	Encore Sampler
13E0744-05	LG-21 (0-2)	Encore Sampler
13E0744-06	LG-21 (20-22)	Encore Sampler
13E0744-07	MW-10 (1-3)	Encore Sampler
13E0744-08	MW-10 (32-34)	Encore Sampler
13E0744-09	LG-19 (0-2)	Encore Sampler
13E0744-10	LG-19 (26-28)	Encore Sampler
13E0744-11	DUP-1 (052113)	Encore Sampler
13E0744-12	TB_052113	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C

Notes and Definitions

U	Analyte included in the analysis, but not detected
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL); therefore, the result is an estimated concentration.
E	The concentration indicated for this analyte is an estimated value above the calibration range of the instrument. This value is considered an estimate.
D	The result reported is from a dilution of the sample due to levels of target compounds found
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants. Data users should consider anything <10x the blank value as artifact.

ND	Analyte NOT DETECTED at the stated Reporting Limit (RL) or above.
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
MDL	METHOD DETECTION LIMIT - the minimum concentration that can be measured and reported with a 99% confidence that the concentration is greater than zero. If requested or required, a value reported below the RL and above the MDL is considered estimated and is noted with a "J" flag.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.

Non-Dir. Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two.
For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the MDL, with values between the MDL and the RL being "J" flagged as estimated results.

YORK ANALYTICAL LABORATORIES
120 RESEARCH DR.
STRATFORD, CT 06615
(203) 325-1371
FAX (203) 357-0166

Field Chain-of-Custody Record

NOTE: York's Std. Terms & Conditions are listed on the back side of this document. This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions.

York Project No. 13E0744

YOUR Information

Company: Langan
Address: 360 W 31st St NY, NY 10001
Phone No. (212) 479-5400
Contact Person: Brandon Nathe
E-Mail Address: BNathe@Langan.com

Report To:

Company: SAME
Address:
Phone No.
Attention: Paul McMahon
E-Mail Address: PMcMahon@Langan.com

Invoice To:

Company: SAME
Address:
Phone No.
Attention:
E-Mail Address:

YOUR Project ID

170246501

Purchase Order No.

Samples from: CT ___ NY X NJ ___

Turn-Around Time

- RUSH - Same Day ☐
- RUSH - Next Day ☐
- RUSH - Two Day ☐
- RUSH - Three Day ☐
- RUSH - Four Day ☑
- Standard(5-7 Days) ☐

Report Type

- Summary Report X
- Summary w/ QA Summary
- CT RCP Package
- CTRCP DQA/DUE Pkg
- NY ASP A Package
- NY ASP B Package X
- NJDEP Red. Deliv.

Electronic Data Deliverables (EDD)

- Simple Excel
- NYSDEC EQuIS X
- EQuIS (std)
- EZ-EDD (EQuIS)
- NJDEP SRP HazSite EDD
- GIS/KEY (std)
- Other

York Regulatory Comparison
Excel Spreadsheet X
Compare to the following Regs. (please fill in):
Part 375 Unrestricted

Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

Samples Collected/Authorized By (Signature)

Paul McMahon
Name (printed)

Matrix Codes
S - soil
Other - specify(oil, etc.)
WW - wastewater
GW - groundwater
DW - drinking water
Air-A - ambient air
Air-SV - soil vapor

Volatiles		Semi-Vols.	Pest/PCB/Herb	Metals	Misc. Org.	Full Lists	Misc.
8260 full	TICs	8270 or 625	8082PCB	RCRA8	TPH GRO	Pri.Poll.	Corrosivity
624	Site Spec.	STARS list	8081Pest	PP13 list	TPH DRO	TCL Organics	Reactivity
STARS list	Nassau Co.	BN Only	8151Herb	TAL	CT ETPH	TAL Met/CN	Ignitability
BTEX	Suffolk Co.	Acids Only	CT RCP	CT15 list	NY 310-13	Full TCLP	Flash Point
MTBE	Ketones	PAH list	App. IX	TAGM list	TPH 1664	Full App. IX	Sieve Anal.
TCL list	Oxygenates	TAGM list	Site Spec.	NJDEP list	Air TO14A	Part360-Routine	Heterotrophs
TAGM list	TCLP list	CT RCP list	SPLP or TCLP	Total	Air TO15	Part360-Baseline	TOX
CT RCP list	524.2	TCL list	TCLP Pest	Dissolved	Air STARS	Part360-Expanded No Dioxins Furans	BTU/lb.
Arom. only	502.2	NJDEP list	TCLP Herb	SPLP or TCLP	Air VPH	Part360-Expanded Full List	Aquatic Tox.
Halog.only	NJDEP list	App. IX	Chlordane	Indiv. Metals	Air TICs	NYCDEP Sewer	TOC
App.IX list	SPLP or TCLP	TCLP BNA	608 Pest	LIST Below	Methane	NYSDEC Sewer	Asbestos
8021B list		SPLP or TCLP	608 PCB		Helium	TAGM	Silica

Sample Identification	Date/Time Sampled	Sample Matrix	Choose Analyses Needed from the Menu Above and Enter Below	Container Description(s)
MW-5 (0-2)	5/21/13 10:25	S	VOC/SVOC/Metals/PCB/Pest (see circled)	1 8-oz., 3 Encore, 1 VOA
MW-5 (6-8)	10:35		VOC/SVOC/Metals/PCB	
LG-20 (0-2)	11:44		VOC/SVOC/Metals/PCB/Pest	
LG-20 (22-24)	12:01		VOC/SVOC/Metals/PCB	
LG-21 (0-2)	10:55		VOC/SVOC/Metals/PCB/Pest	
LG-21 (20-22)	11:25		VOC/SVOC/Metals/PCB	
MW-10 (1-3)	13:33		VOC/SVOC/Metals/PCB/Pest	
MW-10 (32-34)	13:55		VOC/SVOC/Metals/PCB	
LG-19 (0-2)	13:06		VOC/SVOC/Metals/PCB/Pest	
LG-19 (26-28)	13:10		VOC/SVOC/Metals/PCB	

Comments

Preservation Check those Applicable
4°C ___ Frozen ___ HCl ___ MeOH ___ HNO_3 ___ H_2SO_4 ___ NaOH ___
ZnAc ___ Ascorbic Acid ___ Other ___

Special Instructions
Field Filtered ☐
Lab to Filter ☐

Samples Relinquished By	Date/Time 5/21/13 7:45	Samples Received By	Date/Time 5-22-13
Samples Relinquished By	Date/Time	Samples Received in LAB by	Date/Time 5-22-13 1640

Temperature on Receipt 3.3 °C

YORK ANALYTICAL LABORATORIES
120 RESEARCH DR.
STRATFORD, CT 06615
(203) 325-1371
FAX (203) 357-0166

Field Chain-of-Custody Record

NOTE: York's Std. Terms & Conditions are listed on the back side of this document. This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions.

York Project No. 13E0744

YOUR Information

Company: Langan
Address: 360 W 31st St
NY, NY 10001
Phone No. (212) 479-5400
Contact Person: Brandon Nathe
E-Mail Address: BNathe@langan.com

Report To:

Company: SAME
Address:
Phone No.
Attention: Paul McMahon
E-Mail Address: PMcMahon@langan.com

Invoice To:

Company: SAME
Address:
Phone No.
Attention:
E-Mail Address:

YOUR Project ID

170246501

Purchase Order No.

Samples from: CT ___ NY X NJ ___

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- RUSH - Same Day ☐
- RUSH - Next Day ☐
- RUSH - Two Day ☐
- RUSH - Three Day ☐
- RUSH - Four Day ☑
- Standard(5-7 Days) ☐

Report Type

- Summary Report X
- Summary w/ QA Summary
- CT RCP Package
- CTRCP DQA/DUE Pkg
- NY ASP A Package
- NY ASP B Package X
- NJDEP Red. Deliv.

Electronic Data Deliverables (EDD)

- Simple Excel
- NYSDEC EQuIS X
- EQuIS (std)
- EZ-EDD (EQuIS)
- NJDEP SRP HazSite EDD
- GIS/KEY (std)
- Other

York Regulatory Comparison Excel Spreadsheet X
Compare to the following Regs. (please fill in):
Part 375 Unrestricted

Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

Paul McMahon
Samples Collected/Authorized By (Signature)
Paul McMahon
Name (printed)

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Other - specify(oil, etc.)
WW - wastewater
GW - groundwater
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Air-A - ambient air
Air-SV - soil vapor

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TAGM list	TCLP list	CT RCP list	SPLP or TCLP	Total	Air TO15	Part 360-Baseline	TOX
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Halog.only	NJDEP list	App. IX	Chlordane	Indiv. Metals	Air TICs	NYCDEP Sewer	TOC
App.IX list	SPLP or TCLP	TCLP BNA	608 Pest	LIST Below	Methane	NYSDEC Sewer	Asbestos
8021B list		SPLP or TCLP	608 PCB		Helium	TAGM	Silica

Sample Identification	Date/Time Sampled	Sample Matrix	Choose Analyses Needed from the Menu Above and Enter Below	Container Description(s)
DUP-1 (052113)	5/21/13	S	VOC/SVOC/Metals/PCB/Pest	1 8-oz., 3 Encore, 1 VOA
TB-052113	5/21/13	DI Water	VOC	1 VOA

Comments

Preservation Check those Applicable
4°C ___ Frozen ___ HCl ___ MeOH ___ HNO_3 ___ H_2SO_4 ___ NaOH ___
ZnAc ___ Ascorbic Acid ___ Other ___

Special Instructions
Field Filtered ☐
Lab to Filter ☐

Samples Relinquished By — Date/Time: 5/21/13 7:45
Samples Relinquished By — Date/Time:

Samples Received By — Date/Time: 5-22-13
Samples Received in LAB by: Grace — Date/Time: 5-22-13 1640

74.5AM

Temperature on Receipt: 3.3 °C

Technical Report

prepared for:

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Report Date: 05/31/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0868

Report Date: 05/31/2013
Client Project ID: 170246501
York Project (SDG) No.: 13E0868

Langan Engineering & Environmental Services (NYC)
21 Penn Plaza, 360 West 31st Street
New York NY, 10001
Attention: Paul McMahon

Purpose and Results

This report contains the analytical data for the sample(s) identified on the attached chain-of-custody received in our laboratory on May 24, 2013 and listed below. The project was identified as your project: **170246501**.

The analyses were conducted utilizing appropriate EPA, Standard Methods, and ASTM methods as detailed in the data summary tables.

All samples were received in proper condition meeting the customary acceptance requirements for environmental samples except those indicated under the Notes section of this report.

All analyses met the method and laboratory standard operating procedure requirements except as indicated by any data flags, the meaning of which are explained in the attachment to this report, and case narrative if applicable.

The results of the analyses, which are all reported on dry weight basis (soils) unless otherwise noted, are detailed in the following pages.

Please contact Client Services at 203.325.1371 with any questions regarding this report.

York Sample ID	Client Sample ID	Matrix	Date Collected	Date Received
13E0868-01	MW-8_052313	Water	05/23/2013	05/24/2013
13E0868-02	DUP-1_052313	Water	05/23/2013	05/24/2013
13E0868-03	MW-9_052313	Water	05/23/2013	05/24/2013
13E0868-04	MW-6_052313	Water	05/23/2013	05/24/2013
13E0868-05	MW-7_052313	Water	05/23/2013	05/24/2013
13E0868-06	MW-3_052313	Water	05/23/2013	05/24/2013
13E0868-07	MW-10_052313	Water	05/23/2013	05/24/2013
13E0868-08	TRC-MW-3_052413	Water	05/24/2013	05/24/2013
13E0868-09	FB_052413	Water	05/24/2013	05/24/2013

General Notes for York Project (SDG) No.: 13E0868

1. The RLs and MDLs (Reporting Limit and Method Detection Limit respectively) reported are adjusted for any dilution necessary due to the levels of target and/or non-target analytes and matrix interference. The RL(REPORTING LIMIT) is based upon the lowest standard utilized for the calibration where applicable.
2. Samples are retained for a period of thirty days after submittal of report, unless other arrangements are made.
3. York's liability for the above data is limited to the dollar value paid to York for the referenced project.
4. This report shall not be reproduced without the written approval of York Analytical Laboratories, Inc.
5. All samples were received in proper condition for analysis with proper documentation, unless otherwise noted.
6. All analyses conducted met method or Laboratory SOP requirements. See the Qualifiers and/or Narrative sections for further information.
7. It is noted that no analyses reported herein were subcontracted to another laboratory, unless noted in the report.
8. This report reflects results that relate only to the samples submitted on the attached chain-of-custody form(s) received by York.

Approved By: 

Date: 05/31/2013

Benjamin Gulizia
Laboratory Director

YORK

Sample Information

Client Sample ID: MW-8_052313 **York Sample ID:** 13E0868-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 2:32 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
74-83-9	Bromomethane	**2.6**	J	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS

Sample Information

Client Sample ID: MW-8_052313 **York Sample ID:** 13E0868-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 2:32 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-09-2	Methylene chloride	**7.6**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS

Sample Information

Client Sample ID: MW-8_052313 **York Sample ID:** 13E0868-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 2:32 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/28/2013 23:59	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*99.5 %*	*72.6-129*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*100 %*	*63.5-145*
2037-26-5	*Surrogate: Toluene-d8*	*101 %*	*81.2-127*

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0187	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0316	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
62-53-3	Aniline	ND		ug/L	1.82	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
120-12-7	Anthracene	ND		ug/L	0.0206	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0133	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0182	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0328	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.76	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0133	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0224	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	1.03	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.61	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.29	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.61	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.15	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.82	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.62	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
117-81-7	Bis(2-ethylhexyl)phthalate	**0.861**	J	ug/L	0.571	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.67	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
95-57-8	2-Chlorophenol	ND		ug/L	2.17	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.97	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
218-01-9	Chrysene	ND		ug/L	0.0141	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0481	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
132-64-9	Dibenzofuran	ND		ug/L	2.92	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.48	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR

Sample Information

Client Sample ID: MW-8_052313 **York Sample ID:** 13E0868-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 2:32 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-50-1	1,2-Dichlorobenzene	ND		ug/L	3.02	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
541-73-1	1,3-Dichlorobenzene	ND		ug/L	3.16	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.68	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.54	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.29	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
84-66-2	Diethyl phthalate	ND		ug/L	3.10	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	1.94	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
131-11-3	Dimethyl phthalate	ND		ug/L	2.32	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	1.96	12.1	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	2.73	12.1	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	1.95	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	1.95	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.36	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
206-44-0	Fluoranthene	ND		ug/L	0.0264	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
86-73-7	Fluorene	ND		ug/L	0.0127	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.54	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
87-68-3	Hexachlorobutadiene	ND		ug/L	3.38	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	3.07	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
67-72-1	Hexachloroethane	ND		ug/L	3.68	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0164	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
78-59-1	Isophorone	ND		ug/L	3.25	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0526	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.36	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
95-48-7	2-Methylphenol	ND		ug/L	1.41	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
91-20-3	Naphthalene	ND		ug/L	0.00945	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
100-01-6	4-Nitroaniline	ND		ug/L	3.25	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
99-09-2	3-Nitroaniline	ND		ug/L	2.04	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
88-74-4	2-Nitroaniline	ND		ug/L	2.04	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
98-95-3	Nitrobenzene	ND		ug/L	2.05	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
88-75-5	2-Nitrophenol	ND		ug/L	2.86	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
100-02-7	4-Nitrophenol	ND		ug/L	2.01	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	3.10	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR

Sample Information

Client Sample ID: MW-8_052313 **York Sample ID:** 13E0868-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 2:32 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.472	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	6.06	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.76	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
85-01-8	Phenanthrene	ND		ug/L	0.0606	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:22	SR
108-95-2	Phenol	ND		ug/L	1.33	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
129-00-0	Pyrene	ND		ug/L	0.0288	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
110-86-1	Pyridine	ND		ug/L	4.74	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	2.99	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.12	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.32	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 12:46	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*98.6 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*68.9 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*31.2 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*64.0 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*18.0 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*102 %*	*30-130*

Polychlorinated Biphenyls (PCB)

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8082A	05/29/2013 06:17	05/30/2013 16:05	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*43.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*69.7 %*	*30-150*

Sample Information

Client Sample ID: MW-8_052313 **York Sample ID:** 13E0868-01

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 2:32 pm	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**96**		ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-39-3	Barium	**90**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-70-2	Calcium	**137000**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-50-8	Copper	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7439-89-6	Iron	**144**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7439-92-1	Lead	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7439-95-4	Magnesium	**25500**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7439-96-5	Manganese	**1660**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-02-0	Nickel	ND	U	ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-09-7	Potassium	**13100**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-23-5	Sodium	**59500**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW
7440-66-6	Zinc	**29**		ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 10:59	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-09-2	Methylene chloride	**5.6**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 00:38	SS

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**			**Acceptance Range**						
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*103 %*			*72.6-129*						
460-00-4	*Surrogate: p-Bromofluorobenzene*	*102 %*			*63.5-145*						
2037-26-5	*Surrogate: Toluene-d8*	*100 %*			*81.2-127*						

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0166	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0282	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
62-53-3	Aniline	ND		ug/L	1.62	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
120-12-7	Anthracene	ND		ug/L	0.0184	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0119	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0162	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0293	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.57	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0119	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0200	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	0.921	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.44	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.04	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.22	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	1.91	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.62	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.23	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
117-81-7	Bis(2-ethylhexyl)phthalate	**0.789**	J	ug/L	0.509	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.38	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
95-57-8	2-Chlorophenol	ND		ug/L	1.94	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.65	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
218-01-9	Chrysene	ND		ug/L	0.0125	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0429	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
132-64-9	Dibenzofuran	ND		ug/L	2.61	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.22	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.82	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.69	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.39	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.37	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.04	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
84-66-2	Diethyl phthalate	ND		ug/L	2.77	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	1.73	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
131-11-3	Dimethyl phthalate	ND		ug/L	2.06	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	1.75	10.8	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	2.43	10.8	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	1.74	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	1.74	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.21	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
206-44-0	Fluoranthene	ND		ug/L	0.0236	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
86-73-7	Fluorene	ND		ug/L	0.0114	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.37	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
87-68-3	Hexachlorobutadiene	ND		ug/L	3.02	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	2.74	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
67-72-1	Hexachloroethane	ND		ug/L	3.29	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0146	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
78-59-1	Isophorone	ND		ug/L	2.90	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0469	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.21	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
95-48-7	2-Methylphenol	ND		ug/L	1.25	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
91-20-3	Naphthalene	ND		ug/L	0.00843	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
100-01-6	4-Nitroaniline	ND		ug/L	2.90	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
99-09-2	3-Nitroaniline	ND		ug/L	1.82	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
88-74-4	2-Nitroaniline	ND		ug/L	1.82	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
98-95-3	Nitrobenzene	ND		ug/L	1.83	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
88-75-5	2-Nitrophenol	ND		ug/L	2.55	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
100-02-7	4-Nitrophenol	ND		ug/L	1.79	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.77	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.421	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	5.41	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.57	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 14:51	SR
85-01-8	Phenanthrene	ND		ug/L	0.0541	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
108-95-2	Phenol	ND		ug/L	1.19	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
129-00-0	Pyrene	ND		ug/L	0.0257	0.0541	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
110-86-1	Pyridine	ND		ug/L	4.23	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	2.67	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	1.89	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.06	5.41	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:17	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*99.0 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*64.0 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*24.0 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*58.3 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*12.9 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*113 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00500	0.00500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
72-20-8	Endrin	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00400	0.00400	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-85-7	beta-BHC	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
309-00-2	Aldrin	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 11:56	JW
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 16:34	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*39.5 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*64.3 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**411**		ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-39-3	Barium	**143**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-70-2	Calcium	**110000**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-50-8	Copper	**8**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7439-89-6	Iron	**1450**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7439-92-1	Lead	**3**		ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7439-95-4	Magnesium	**20500**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW

Sample Information

Client Sample ID: DUP-1_052313 **York Sample ID:** 13E0868-02

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 3:00 pm	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-96-5	Manganese	**343**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-02-0	Nickel	ND	U	ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-09-7	Potassium	**11000**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-23-5	Sodium	**53800**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW
7440-66-6	Zinc	ND	U	ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:17	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-09-2	Methylene chloride	**6.3**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:18	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*104 %*	*72.6-129*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*102 %*	*63.5-145*
2037-26-5	*Surrogate: Toluene-d8*	*99.5 %*	*81.2-127*

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0162	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0275	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
62-53-3	Aniline	ND		ug/L	1.58	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
120-12-7	Anthracene	ND		ug/L	0.0179	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0116	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0158	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0285	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.53	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0116	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0195	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	0.897	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.40	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	1.99	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.14	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	1.86	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.58	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.15	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND		ug/L	0.496	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.32	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
95-57-8	2-Chlorophenol	ND		ug/L	1.88	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.58	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
218-01-9	Chrysene	ND		ug/L	0.0122	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0418	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
132-64-9	Dibenzofuran	ND		ug/L	2.54	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.16	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.75	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.62	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.33	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.34	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	1.99	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
84-66-2	Diethyl phthalate	ND		ug/L	2.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	1.68	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND		ug/L	2.01	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	1.71	10.5	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	2.37	10.5	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	1.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	1.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.18	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
206-44-0	Fluoranthene	ND		ug/L	0.0229	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
86-73-7	Fluorene	ND		ug/L	0.0111	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.34	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
87-68-3	Hexachlorobutadiene	ND		ug/L	2.94	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	2.66	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
67-72-1	Hexachloroethane	ND		ug/L	3.20	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0142	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
78-59-1	Isophorone	ND		ug/L	2.82	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0457	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.18	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
95-48-7	2-Methylphenol	ND		ug/L	1.22	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
91-20-3	Naphthalene	ND		ug/L	0.00821	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
100-01-6	4-Nitroaniline	ND		ug/L	2.82	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
99-09-2	3-Nitroaniline	ND		ug/L	1.77	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
88-74-4	2-Nitroaniline	ND		ug/L	1.77	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
98-95-3	Nitrobenzene	ND		ug/L	1.78	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
88-75-5	2-Nitrophenol	ND		ug/L	2.48	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
100-02-7	4-Nitrophenol	ND		ug/L	1.75	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.409	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	5.26	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.53	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
85-01-8	Phenanthrene	ND		ug/L	0.0526	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
108-95-2	Phenol	ND		ug/L	1.16	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
129-00-0	Pyrene	ND		ug/L	0.0251	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:20	SR
110-86-1	Pyridine	ND		ug/L	4.12	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	2.60	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	1.84	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.01	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 13:48	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*89.3 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*68.4 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*28.1 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*65.9 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*15.6 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*102 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00541	0.00541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
72-20-8	Endrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00432	0.00432	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
319-85-7	beta-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
309-00-2	Aldrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:11	JW

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:04	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*36.7 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*49.9 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**78**		ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-39-3	Barium	**72**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-70-2	Calcium	**103000**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-50-8	Copper	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7439-89-6	Iron	**211**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7439-92-1	Lead	**3**		ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7439-95-4	Magnesium	**25800**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7439-96-5	Manganese	**315**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-02-0	Nickel	ND	U	ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-09-7	Potassium	**12100**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-23-5	Sodium	**71400**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW

Sample Information

Client Sample ID: MW-9_052313 **York Sample ID:** 13E0868-03

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 8:55 am	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW
7440-66-6	Zinc	**21**		ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:22	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: MW-6_052313 **York Sample ID:** 13E0868-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 10:00 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS

Sample Information

Client Sample ID: MW-6_052313 **York Sample ID:** 13E0868-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 10:00 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-09-2	Methylene chloride	**6.2**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS

Sample Information

Client Sample ID: MW-6_052313 **York Sample ID:** 13E0868-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 10:00 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 01:58	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*103 %*	*72.6-129*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*99.4 %*	*63.5-145*
2037-26-5	*Surrogate: Toluene-d8*	*101 %*	*81.2-127*

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0220	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0373	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
62-53-3	Aniline	ND		ug/L	2.14	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
120-12-7	Anthracene	ND		ug/L	0.0243	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0157	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0214	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0387	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
100-51-6	Benzyl alcohol	ND		ug/L	2.07	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0157	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR

Sample Information

Client Sample ID: MW-6_052313 **York Sample ID:** 13E0868-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 10:00 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0264	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	1.22	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.90	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.70	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
106-47-8	4-Chloroaniline	ND		ug/L	4.26	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.53	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	2.14	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	4.27	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
117-81-7	Bis(2-ethylhexyl)phthalate	**0.943**	J	ug/L	0.673	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	3.14	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
95-57-8	2-Chlorophenol	ND		ug/L	2.56	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	3.50	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
218-01-9	Chrysene	ND		ug/L	0.0166	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0567	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
132-64-9	Dibenzofuran	ND		ug/L	3.44	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.93	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
95-50-1	1,2-Dichlorobenzene	ND		ug/L	3.56	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
541-73-1	1,3-Dichlorobenzene	ND		ug/L	3.73	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	3.16	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.81	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.70	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
84-66-2	Diethyl phthalate	ND		ug/L	3.66	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	2.29	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
131-11-3	Dimethyl phthalate	ND		ug/L	2.73	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	2.31	14.3	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	3.21	14.3	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.30	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.30	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.60	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
206-44-0	Fluoranthene	ND		ug/L	0.0311	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
86-73-7	Fluorene	ND		ug/L	0.0150	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.81	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR

Sample Information

Client Sample ID: MW-6_052313 **York Sample ID:** 13E0868-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 10:00 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-68-3	Hexachlorobutadiene	ND		ug/L	3.99	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	3.61	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
67-72-1	Hexachloroethane	ND		ug/L	4.34	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0193	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
78-59-1	Isophorone	ND		ug/L	3.83	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0620	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.60	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
95-48-7	2-Methylphenol	ND		ug/L	1.66	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
91-20-3	Naphthalene	ND		ug/L	0.0111	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
100-01-6	4-Nitroaniline	ND		ug/L	3.83	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
99-09-2	3-Nitroaniline	ND		ug/L	2.40	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
88-74-4	2-Nitroaniline	ND		ug/L	2.40	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
98-95-3	Nitrobenzene	ND		ug/L	2.41	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
88-75-5	2-Nitrophenol	ND		ug/L	3.37	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
100-02-7	4-Nitrophenol	ND		ug/L	2.37	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	3.66	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.556	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	7.14	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
87-86-5	Pentachlorophenol	ND		ug/L	2.07	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 15:48	SR
85-01-8	Phenanthrene	ND		ug/L	0.0714	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
108-95-2	Phenol	ND		ug/L	1.57	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
129-00-0	Pyrene	ND		ug/L	0.0340	0.0714	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
110-86-1	Pyridine	ND		ug/L	5.59	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	3.53	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.50	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.73	7.14	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:20	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*94.2 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*73.0 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*34.4 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*70.6 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*19.1 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*108 %*	*30-130*

Sample Information

Client Sample ID: MW-6_052313 **York Sample ID:** 13E0868-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 10:00 am	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00556	0.00556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
72-20-8	Endrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00444	0.00444	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
319-85-7	beta-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
309-00-2	Aldrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:26	JW
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 17:33	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*30.7 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*44.7 %*	*30-150*

Sample Information

Client Sample ID: MW-6_052313 **York Sample ID:** 13E0868-04

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 10:00 am	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**259**		ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-39-3	Barium	**79**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-70-2	Calcium	**87000**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-50-8	Copper	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7439-89-6	Iron	**529**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7439-92-1	Lead	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7439-95-4	Magnesium	**26700**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7439-96-5	Manganese	**352**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-02-0	Nickel	**6**		ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-09-7	Potassium	**13200**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-23-5	Sodium	**47200**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW
7440-66-6	Zinc	ND	U	ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:27	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-09-2	Methylene chloride	**7.3**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 02:37	SS

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**			**Acceptance Range**						
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*105 %*			*72.6-129*						
460-00-4	*Surrogate: p-Bromofluorobenzene*	*97.4 %*			*63.5-145*						
2037-26-5	*Surrogate: Toluene-d8*	*99.7 %*			*81.2-127*						

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0187	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0316	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
62-53-3	Aniline	ND		ug/L	1.82	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
120-12-7	Anthracene	ND		ug/L	0.0206	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0133	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0182	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0328	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.76	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0133	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0224	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	1.03	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.61	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.29	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.61	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.15	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.82	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.62	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND		ug/L	0.571	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.67	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
95-57-8	2-Chlorophenol	ND		ug/L	2.17	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.97	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
218-01-9	Chrysene	ND		ug/L	0.0141	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0481	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
132-64-9	Dibenzofuran	ND		ug/L	2.92	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.48	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
95-50-1	1,2-Dichlorobenzene	ND		ug/L	3.02	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Semi-Volatiles, 8270 List - low level **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
541-73-1	1,3-Dichlorobenzene	ND		ug/L	3.16	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.68	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.54	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.29	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
84-66-2	Diethyl phthalate	ND		ug/L	3.10	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	1.94	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
131-11-3	Dimethyl phthalate	ND		ug/L	2.32	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	1.96	12.1	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	2.73	12.1	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	1.95	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	1.95	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.36	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
206-44-0	Fluoranthene	ND		ug/L	0.0264	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
86-73-7	Fluorene	ND		ug/L	0.0127	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.54	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
87-68-3	Hexachlorobutadiene	ND		ug/L	3.38	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	3.07	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
67-72-1	Hexachloroethane	ND		ug/L	3.68	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0164	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
78-59-1	Isophorone	ND		ug/L	3.25	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0526	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.36	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
95-48-7	2-Methylphenol	ND		ug/L	1.41	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
91-20-3	Naphthalene	ND		ug/L	0.00945	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
100-01-6	4-Nitroaniline	ND		ug/L	3.25	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
99-09-2	3-Nitroaniline	ND		ug/L	2.04	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
88-74-4	2-Nitroaniline	ND		ug/L	2.04	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
98-95-3	Nitrobenzene	ND		ug/L	2.05	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
88-75-5	2-Nitrophenol	ND		ug/L	2.86	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
100-02-7	4-Nitrophenol	ND		ug/L	2.01	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	3.10	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.472	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	6.06	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.76	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
85-01-8	Phenanthrene	ND		ug/L	0.0606	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
108-95-2	Phenol	ND		ug/L	1.33	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
129-00-0	Pyrene	ND		ug/L	0.0288	0.0606	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:17	SR
110-86-1	Pyridine	ND		ug/L	4.74	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	2.99	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.12	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.32	6.06	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 14:51	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*85.3 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*65.3 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*26.1 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*60.7 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*14.3 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*92.4 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00500	0.00500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
72-20-8	Endrin	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00400	0.00400	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-85-7	beta-BHC	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
309-00-2	Aldrin	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00100	0.00100	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:41	JW
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0500	0.0500	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:02	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*36.2 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*50.2 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**1180**		ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-39-3	Barium	**165**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-70-2	Calcium	**110000**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-50-8	Copper	**10**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7439-89-6	Iron	**4060**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7439-92-1	Lead	**4**		ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7439-95-4	Magnesium	**21000**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW

Sample Information

Client Sample ID: MW-7_052313 **York Sample ID:** 13E0868-05

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 1:30 pm	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-96-5	Manganese	**351**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-02-0	Nickel	ND	U	ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-09-7	Potassium	**11500**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-23-5	Sodium	**53200**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW
7440-66-6	Zinc	**25**		ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:32	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-09-2	Methylene chloride	**7.2**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:17	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*105 %*	*72.6-129*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*95.7 %*	*63.5-145*
2037-26-5	*Surrogate: Toluene-d8*	*101 %*	*81.2-127*

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0176	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0298	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
62-53-3	Aniline	ND		ug/L	1.71	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
120-12-7	Anthracene	ND		ug/L	0.0194	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0126	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0171	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0310	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.66	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0126	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0211	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	0.974	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.52	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.16	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.41	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.02	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.71	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.42	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
117-81-7	Bis(2-ethylhexyl)phthalate	**0.640**	J	ug/L	0.538	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.51	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
95-57-8	2-Chlorophenol	ND		ug/L	2.05	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.80	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
218-01-9	Chrysene	ND		ug/L	0.0133	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0454	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
132-64-9	Dibenzofuran	ND		ug/L	2.75	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.34	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.98	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.85	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.53	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.45	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.16	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
84-66-2	Diethyl phthalate	ND		ug/L	2.93	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	1.83	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND		ug/L	2.18	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	1.85	11.4	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	2.57	11.4	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	1.84	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	1.84	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.28	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
206-44-0	Fluoranthene	ND		ug/L	0.0249	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
86-73-7	Fluorene	ND		ug/L	0.0120	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.45	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
87-68-3	Hexachlorobutadiene	ND		ug/L	3.19	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	2.89	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
67-72-1	Hexachloroethane	ND		ug/L	3.47	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0154	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
78-59-1	Isophorone	ND		ug/L	3.06	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0496	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.28	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
95-48-7	2-Methylphenol	ND		ug/L	1.33	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
91-20-3	Naphthalene	ND		ug/L	0.00891	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
100-01-6	4-Nitroaniline	ND		ug/L	3.06	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
99-09-2	3-Nitroaniline	ND		ug/L	1.92	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
88-74-4	2-Nitroaniline	ND		ug/L	1.92	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
98-95-3	Nitrobenzene	ND		ug/L	1.93	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
88-75-5	2-Nitrophenol	ND		ug/L	2.70	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
100-02-7	4-Nitrophenol	ND		ug/L	1.90	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.93	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.445	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	5.71	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.66	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
85-01-8	Phenanthrene	ND		ug/L	0.0571	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
108-95-2	Phenol	ND		ug/L	1.26	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
129-00-0	Pyrene	ND		ug/L	0.0272	0.0571	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 16:45	SR
110-86-1	Pyridine	ND		ug/L	4.47	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	2.82	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.00	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.18	5.71	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:22	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*95.1 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*71.7 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*31.4 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*66.3 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*17.9 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*97.1 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00541	0.00541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
72-20-8	Endrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00432	0.00432	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
319-85-7	beta-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
309-00-2	Aldrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 12:57	JW

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 18:32	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*33.3 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*38.0 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	ND	U	ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-39-3	Barium	**255**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-70-2	Calcium	**111000**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-50-8	Copper	**12**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7439-89-6	Iron	**52**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7439-92-1	Lead	**4**		ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7439-95-4	Magnesium	**17000**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7439-96-5	Manganese	**293**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-02-0	Nickel	**7**		ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-09-7	Potassium	**11000**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-23-5	Sodium	**124000**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW

Sample Information

Client Sample ID: MW-3_052313 **York Sample ID:** 13E0868-06

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 12:20 pm	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW
7440-66-6	Zinc	**50**		ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:49	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: MW-10_052313 **York Sample ID:** 13E0868-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 4:20 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS

Sample Information

Client Sample ID: MW-10_052313 **York Sample ID:** 13E0868-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 4:20 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-09-2	Methylene chloride	**5.9**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS

Sample Information

Client Sample ID: MW-10_052313 **York Sample ID:** 13E0868-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 4:20 pm	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 03:57	SS

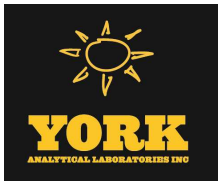
	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*107 %*	*72.6-129*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*98.5 %*	*63.5-145*
2037-26-5	*Surrogate: Toluene-d8*	*102 %*	*81.2-127*

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0205	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0348	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
62-53-3	Aniline	ND		ug/L	2.00	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
120-12-7	Anthracene	ND		ug/L	0.0227	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0147	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0200	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0361	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.93	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0147	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR



Sample Information

Client Sample ID: MW-10_052313 **York Sample ID:** 13E0868-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 4:20 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0247	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	1.14	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.77	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.52	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.97	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	2.36	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	2.00	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.99	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND		ug/L	0.628	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.93	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
95-57-8	2-Chlorophenol	ND		ug/L	2.39	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	3.27	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
218-01-9	Chrysene	ND		ug/L	0.0155	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0529	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
132-64-9	Dibenzofuran	ND		ug/L	3.21	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.73	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
541-73-1	1,3-Dichlorobenzene	ND		ug/L	3.48	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
95-50-1	1,2-Dichlorobenzene	ND		ug/L	3.32	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.95	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.69	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.52	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
84-66-2	Diethyl phthalate	ND		ug/L	3.41	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	2.13	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
131-11-3	Dimethyl phthalate	ND		ug/L	2.55	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	2.16	13.3	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	3.00	13.3	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	2.15	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	2.15	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.49	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
206-44-0	Fluoranthene	ND		ug/L	0.0291	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
86-73-7	Fluorene	ND		ug/L	0.0140	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.69	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR

Sample Information

Client Sample ID: MW-10_052313 **York Sample ID:** 13E0868-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 4:20 pm	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-68-3	Hexachlorobutadiene	ND		ug/L	3.72	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	3.37	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
67-72-1	Hexachloroethane	ND		ug/L	4.05	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0180	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
78-59-1	Isophorone	ND		ug/L	3.57	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0579	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.49	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
95-48-7	2-Methylphenol	ND		ug/L	1.55	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
91-20-3	Naphthalene	ND		ug/L	0.0104	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
100-01-6	4-Nitroaniline	ND		ug/L	3.57	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
99-09-2	3-Nitroaniline	ND		ug/L	2.24	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
88-74-4	2-Nitroaniline	ND		ug/L	2.24	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
98-95-3	Nitrobenzene	ND		ug/L	2.25	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
88-75-5	2-Nitrophenol	ND		ug/L	3.15	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
100-02-7	4-Nitrophenol	ND		ug/L	2.21	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	3.41	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.519	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	6.67	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.93	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
85-01-8	Phenanthrene	ND		ug/L	0.0667	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
108-95-2	Phenol	ND		ug/L	1.47	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
129-00-0	Pyrene	ND		ug/L	0.0317	0.0667	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:14	SR
110-86-1	Pyridine	ND		ug/L	5.21	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	3.29	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	2.33	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.55	6.67	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 15:53	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*79.8 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*68.1 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*29.6 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*61.9 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*17.1 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*85.8 %*	*30-130*

Sample Information

Client Sample ID: MW-10_052313 **York Sample ID:** 13E0868-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 4:20 pm	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00556	0.00556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
72-20-8	Endrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00444	0.00444	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
319-85-7	beta-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
309-00-2	Aldrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:12	JW
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:01	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*45.9 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*50.2 %*	*30-150*

Sample Information

Client Sample ID: MW-10_052313 **York Sample ID:** 13E0868-07

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 23, 2013 4:20 pm	05/24/2013

Metals, Target Analyte **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**46**		ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-39-3	Barium	**66**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-70-2	Calcium	**87700**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-50-8	Copper	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7439-89-6	Iron	**22**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7439-92-1	Lead	**7**		ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7439-95-4	Magnesium	**22300**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7439-96-5	Manganese	**706**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-02-0	Nickel	**6**		ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-09-7	Potassium	**8280**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-23-5	Sodium	**332000**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW
7440-66-6	Zinc	**39**		ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:54	MW

Mercury by 7470/7471 **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Volatile Organics, 8260 List **Log-in Notes:** **Sample Notes:**

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-09-2	Methylene chloride	**6.1**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 04:36	SS

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
	Surrogate Recoveries	**Result**			**Acceptance Range**						
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*102 %*			*72.6-129*						
460-00-4	*Surrogate: p-Bromofluorobenzene*	*101 %*			*63.5-145*						
2037-26-5	*Surrogate: Toluene-d8*	*102 %*			*81.2-127*						

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0171	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0290	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
62-53-3	Aniline	ND		ug/L	1.67	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
120-12-7	Anthracene	ND		ug/L	0.0189	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0122	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0167	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0301	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.61	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0122	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0206	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	0.947	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.48	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	2.10	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.31	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	1.97	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.67	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.32	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND		ug/L	0.523	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.44	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
95-57-8	2-Chlorophenol	ND		ug/L	1.99	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.72	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
218-01-9	Chrysene	ND		ug/L	0.0129	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0441	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
132-64-9	Dibenzofuran	ND		ug/L	2.68	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.28	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.77	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Semi-Volatiles, 8270 List - low level **Log-in Notes:** **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.90	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.46	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.41	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	2.10	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
84-66-2	Diethyl phthalate	ND		ug/L	2.84	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	1.78	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
131-11-3	Dimethyl phthalate	ND		ug/L	2.12	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	1.80	11.1	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	2.50	11.1	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	1.79	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	1.79	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.24	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
206-44-0	Fluoranthene	ND		ug/L	0.0242	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
86-73-7	Fluorene	ND		ug/L	0.0117	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.41	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
87-68-3	Hexachlorobutadiene	ND		ug/L	3.10	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	2.81	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
67-72-1	Hexachloroethane	ND		ug/L	3.38	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0150	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
78-59-1	Isophorone	ND		ug/L	2.98	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0482	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.24	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
95-48-7	2-Methylphenol	ND		ug/L	1.29	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
91-20-3	Naphthalene	ND		ug/L	0.00867	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
100-01-6	4-Nitroaniline	ND		ug/L	2.98	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
99-09-2	3-Nitroaniline	ND		ug/L	1.87	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
88-74-4	2-Nitroaniline	ND		ug/L	1.87	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
98-95-3	Nitrobenzene	ND		ug/L	1.88	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
88-75-5	2-Nitrophenol	ND		ug/L	2.62	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
100-02-7	4-Nitrophenol	ND		ug/L	1.84	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.84	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.432	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	5.56	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.61	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
85-01-8	Phenanthrene	ND		ug/L	0.0556	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
108-95-2	Phenol	ND		ug/L	1.22	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
129-00-0	Pyrene	ND		ug/L	0.0264	0.0556	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 17:42	SR
110-86-1	Pyridine	ND		ug/L	4.34	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	2.74	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	1.94	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.12	5.56	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:25	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*67.5 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*57.8 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*25.8 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*54.9 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*14.3 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*89.6 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00556	0.00556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
72-20-8	Endrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00444	0.00444	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
319-85-7	beta-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
309-00-2	Aldrin	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00111	0.00111	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:27	JW
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0556	0.0556	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 19:30	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*31.2 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*45.0 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	**32**		ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-39-3	Barium	**60**		ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-70-2	Calcium	**82000**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-50-8	Copper	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7439-89-6	Iron	**77**		ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7439-92-1	Lead	**4**		ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7439-95-4	Magnesium	**21600**		ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW

Sample Information

Client Sample ID: TRC-MW-3_052413 **York Sample ID:** 13E0868-08

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 10:20 am	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-96-5	Manganese	**44**		ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-02-0	Nickel	ND	U	ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-09-7	Potassium	**7890**		ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-23-5	Sodium	**326000**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW
7440-66-6	Zinc	**20**		ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 11:59	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
630-20-6	1,1,1,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
71-55-6	1,1,1-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
79-34-5	1,1,2,2-Tetrachloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
76-13-1	,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
79-00-5	1,1,2-Trichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-34-3	1,1-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-35-4	1,1-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
563-58-6	1,1-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
87-61-6	1,2,3-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
96-18-4	1,2,3-Trichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
120-82-1	1,2,4-Trichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
95-63-6	1,2,4-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
96-12-8	1,2-Dibromo-3-chloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
106-93-4	1,2-Dibromoethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
95-50-1	1,2-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
107-06-2	1,2-Dichloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
78-87-5	1,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
108-67-8	1,3,5-Trimethylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
541-73-1	1,3-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
142-28-9	1,3-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
106-46-7	1,4-Dichlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
594-20-7	2,2-Dichloropropane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
78-93-3	2-Butanone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
95-49-8	2-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
106-43-4	4-Chlorotoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
67-64-1	Acetone	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
71-43-2	Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
108-86-1	Bromobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
74-97-5	Bromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-27-4	Bromodichloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-25-2	Bromoform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
74-83-9	Bromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
56-23-5	Carbon tetrachloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
108-90-7	Chlorobenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-00-3	Chloroethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
67-66-3	Chloroform	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
74-87-3	Chloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
156-59-2	cis-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
10061-01-5	cis-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
124-48-1	Dibromochloromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
74-95-3	Dibromomethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-71-8	Dichlorodifluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
100-41-4	Ethyl Benzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Volatile Organics, 8260 List

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 5030B

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
87-68-3	Hexachlorobutadiene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
98-82-8	Isopropylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
1634-04-4	Methyl tert-butyl ether (MTBE)	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-09-2	Methylene chloride	**7.2**		ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
91-20-3	Naphthalene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
104-51-8	n-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
103-65-1	n-Propylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
95-47-6	o-Xylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
179601-23-1	p- & m- Xylenes	ND	U	ug/L	5.0	10	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
99-87-6	p-Isopropyltoluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
135-98-8	sec-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
100-42-5	Styrene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
98-06-6	tert-Butylbenzene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
127-18-4	Tetrachloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
108-88-3	Toluene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
156-60-5	trans-1,2-Dichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
10061-02-6	trans-1,3-Dichloropropylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
79-01-6	Trichloroethylene	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-69-4	Trichlorofluoromethane	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
75-01-4	Vinyl Chloride	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
1330-20-7	Xylenes, Total	ND	U	ug/L	7.5	15	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS
108-05-4	Vinyl acetate	ND	U	ug/L	2.5	5.0	1	EPA SW846-8260B	05/28/2013 12:55	05/29/2013 05:16	SS

	Surrogate Recoveries	Result	Acceptance Range
17060-07-0	*Surrogate: 1,2-Dichloroethane-d4*	*107 %*	*72.6-129*
460-00-4	*Surrogate: p-Bromofluorobenzene*	*99.6 %*	*63.5-145*
2037-26-5	*Surrogate: Toluene-d8*	*101 %*	*81.2-127*

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
83-32-9	Acenaphthene	ND		ug/L	0.0162	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
208-96-8	Acenaphthylene	ND		ug/L	0.0275	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
62-53-3	Aniline	ND		ug/L	1.58	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
120-12-7	Anthracene	ND		ug/L	0.0179	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
56-55-3	Benzo(a)anthracene	ND		ug/L	0.0116	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
50-32-8	Benzo(a)pyrene	ND		ug/L	0.0158	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
205-99-2	Benzo(b)fluoranthene	ND		ug/L	0.0285	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
100-51-6	Benzyl alcohol	ND		ug/L	1.53	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
191-24-2	Benzo(g,h,i)perylene	ND		ug/L	0.0116	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
207-08-9	Benzo(k)fluoranthene	ND		ug/L	0.0195	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
85-68-7	Benzyl butyl phthalate	ND		ug/L	0.897	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
101-55-3	4-Bromophenyl phenyl ether	ND		ug/L	1.40	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
59-50-7	4-Chloro-3-methylphenol	ND		ug/L	1.99	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
106-47-8	4-Chloroaniline	ND		ug/L	3.14	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
111-91-1	Bis(2-chloroethoxy)methane	ND		ug/L	1.86	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
111-44-4	Bis(2-chloroethyl)ether	ND		ug/L	1.58	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
108-60-1	Bis(2-chloroisopropyl)ether	ND		ug/L	3.15	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
117-81-7	Bis(2-ethylhexyl)phthalate	ND		ug/L	0.496	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
91-58-7	2-Chloronaphthalene	ND		ug/L	2.32	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
95-57-8	2-Chlorophenol	ND		ug/L	1.88	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
7005-72-3	4-Chlorophenyl phenyl ether	ND		ug/L	2.58	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
218-01-9	Chrysene	ND		ug/L	0.0122	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
53-70-3	Dibenzo(a,h)anthracene	ND		ug/L	0.0418	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
132-64-9	Dibenzofuran	ND		ug/L	2.54	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
84-74-2	Di-n-butyl phthalate	ND		ug/L	2.16	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
95-50-1	1,2-Dichlorobenzene	ND		ug/L	2.62	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
541-73-1	1,3-Dichlorobenzene	ND		ug/L	2.75	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
106-46-7	1,4-Dichlorobenzene	ND		ug/L	2.33	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
91-94-1	3,3'-Dichlorobenzidine	ND		ug/L	1.34	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
120-83-2	2,4-Dichlorophenol	ND		ug/L	1.99	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
84-66-2	Diethyl phthalate	ND		ug/L	2.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
105-67-9	2,4-Dimethylphenol	ND		ug/L	1.68	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes:

Sample Notes:

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
131-11-3	Dimethyl phthalate	ND		ug/L	2.01	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
534-52-1	4,6-Dinitro-2-methylphenol	ND		ug/L	1.71	10.5	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
51-28-5	2,4-Dinitrophenol	ND		ug/L	2.37	10.5	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
606-20-2	2,6-Dinitrotoluene	ND		ug/L	1.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
121-14-2	2,4-Dinitrotoluene	ND		ug/L	1.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
117-84-0	Di-n-octyl phthalate	ND		ug/L	1.18	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
206-44-0	Fluoranthene	ND		ug/L	0.0229	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
86-73-7	Fluorene	ND		ug/L	0.0111	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
118-74-1	Hexachlorobenzene	ND		ug/L	1.34	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
87-68-3	Hexachlorobutadiene	ND		ug/L	2.94	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
77-47-4	Hexachlorocyclopentadiene	ND		ug/L	2.66	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
67-72-1	Hexachloroethane	ND		ug/L	3.20	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
193-39-5	Indeno(1,2,3-cd)pyrene	ND		ug/L	0.0142	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
78-59-1	Isophorone	ND		ug/L	2.82	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
91-57-6	2-Methylnaphthalene	ND		ug/L	0.0457	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
65794-96-9	3- & 4-Methylphenols	ND		ug/L	1.18	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
95-48-7	2-Methylphenol	ND		ug/L	1.22	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
91-20-3	Naphthalene	ND		ug/L	0.00821	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
100-01-6	4-Nitroaniline	ND		ug/L	2.82	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
99-09-2	3-Nitroaniline	ND		ug/L	1.77	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
88-74-4	2-Nitroaniline	ND		ug/L	1.77	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
98-95-3	Nitrobenzene	ND		ug/L	1.78	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
88-75-5	2-Nitrophenol	ND		ug/L	2.48	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
100-02-7	4-Nitrophenol	ND		ug/L	1.75	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
621-64-7	N-nitroso-di-n-propylamine	ND		ug/L	2.69	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
62-75-9	N-Nitrosodimethylamine	ND		ug/L	0.409	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
86-30-6	N-Nitrosodiphenylamine	ND		ug/L	5.26	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
87-86-5	Pentachlorophenol	ND		ug/L	1.53	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
85-01-8	Phenanthrene	ND		ug/L	0.0526	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
108-95-2	Phenol	ND		ug/L	1.16	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
129-00-0	Pyrene	ND		ug/L	0.0251	0.0526	1	EPA SW-846 8270C	05/29/2013 09:10	05/29/2013 18:11	SR
110-86-1	Pyridine	ND		ug/L	4.12	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Semi-Volatiles, 8270 List - low level

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3510C

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
120-82-1	1,2,4-Trichlorobenzene	ND		ug/L	2.60	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
88-06-2	2,4,6-Trichlorophenol	ND		ug/L	1.84	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR
95-95-4	2,4,5-Trichlorophenol	ND		ug/L	2.01	5.26	1	EPA SW-846 8270C	05/29/2013 09:10	05/30/2013 16:56	SR

	Surrogate Recoveries	Result	Acceptance Range
5175-83-7	*Surrogate: 2,4,6-Tribromophenol*	*79.5 %*	*15-110*
321-60-8	*Surrogate: 2-Fluorobiphenyl*	*67.6 %*	*30-130*
367-12-4	*Surrogate: 2-Fluorophenol*	*25.9 %*	*15-110*
4165-60-0	*Surrogate: Nitrobenzene-d5*	*62.6 %*	*30-130*
4165-62-2	*Surrogate: Phenol-d5*	*13.7 %*	*10-110*
1718-51-0	*Surrogate: Terphenyl-d14*	*89.5 %*	*30-130*

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
8001-35-2	Toxaphene	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
72-43-5	Methoxychlor	ND	U	ug/L	0.00541	0.00541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
1024-57-3	Heptachlor epoxide	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
76-44-8	Heptachlor	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
58-89-9	gamma-BHC (Lindane)	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
53494-70-5	Endrin ketone	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
7421-93-4	Endrin aldehyde	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
72-20-8	Endrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
1031-07-8	Endosulfan sulfate	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
33213-65-9	Endosulfan II	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
959-98-8	Endosulfan I	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
60-57-1	Dieldrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
319-86-8	delta-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
57-74-9	Chlordane, total	ND	U	ug/L	0.00432	0.00432	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
319-85-7	beta-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
319-84-6	alpha-BHC	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
309-00-2	Aldrin	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
50-29-3	4,4'-DDT	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
72-55-9	4,4'-DDE	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW
72-54-8	4,4'-DDD	ND	U	ug/L	0.00108	0.00108	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/31/2013 13:42	JW

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Pesticides/PCBs, EPA 8081/8082 List

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-3510C Low Level

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
11096-82-5	Aroclor 1260	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW
11097-69-1	Aroclor 1254	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW
12672-29-6	Aroclor 1248	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW
53469-21-9	Aroclor 1242	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW
11141-16-5	Aroclor 1232	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW
11104-28-2	Aroclor 1221	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW
12674-11-2	Aroclor 1016	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW
1336-36-3	Total PCBs	ND	U	ug/L	0.0541	0.0541	1	EPA SW 846-8081/8082	05/29/2013 06:17	05/30/2013 20:00	JW

	Surrogate Recoveries	Result	Acceptance Range
877-09-8	*Surrogate: Tetrachloro-m-xylene*	*45.4 %*	*30-150*
2051-24-3	*Surrogate: Decachlorobiphenyl*	*49.6 %*	*30-150*

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7429-90-5	Aluminum	ND	U	ug/L	10	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-36-0	Antimony	ND	U	ug/L	3	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-38-2	Arsenic	ND	U	ug/L	4	4	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-39-3	Barium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-41-7	Beryllium	ND	U	ug/L	1	1	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-43-9	Cadmium	ND	U	ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-70-2	Calcium	**295**		ug/L	19	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-47-3	Chromium	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-48-4	Cobalt	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-50-8	Copper	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7439-89-6	Iron	ND	U	ug/L	10	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7439-92-1	Lead	**4**		ug/L	2	3	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7439-95-4	Magnesium	ND	U	ug/L	10	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7439-96-5	Manganese	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-02-0	Nickel	ND	U	ug/L	1	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-09-7	Potassium	ND	U	ug/L	26	50	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7782-49-2	Selenium	ND	U	ug/L	7	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-22-4	Silver	ND	U	ug/L	2	5	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-23-5	Sodium	**214**		ug/L	61	100	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW

Sample Information

Client Sample ID: FB_052413 **York Sample ID:** 13E0868-09

York Project (SDG) No.	Client Project ID	Matrix	Collection Date/Time	Date Received
13E0868	170246501	Water	May 24, 2013 9:20 am	05/24/2013

Metals, Target Analyte

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA 3010A

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7440-28-0	Thallium	ND	U	ug/L	3	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-62-2	Vanadium	ND	U	ug/L	2	10	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW
7440-66-6	Zinc	**36**		ug/L	2	20	1	EPA SW846-6010B/EPA 200.7	05/30/2013 08:02	05/30/2013 12:04	MW

Mercury by 7470/7471

Log-in Notes: **Sample Notes:**

Sample Prepared by Method: EPA SW846-7470

CAS No.	Parameter	Result	Flag	Units	MDL	RL	Dilution	Reference Method	Date/Time Prepared	Date/Time Analyzed	Analyst
7439-97-6	Mercury	ND	U	ug/L	0.2	0.2	1	EPA SW846-7470	05/29/2013 13:49	05/30/2013 11:28	AA

Analytical Batch Summary

Batch ID: BE31237 **Preparation Method:** EPA 5030B **Prepared By:** EKM

YORK Sample ID	Client Sample ID	Preparation Date
13E0868-01	MW-8_052313	05/28/13
13E0868-02	DUP-1_052313	05/28/13
13E0868-03	MW-9_052313	05/28/13
13E0868-04	MW-6_052313	05/28/13
13E0868-05	MW-7_052313	05/28/13
13E0868-06	MW-3_052313	05/28/13
13E0868-07	MW-10_052313	05/28/13
13E0868-08	TRC-MW-3_052413	05/28/13
13E0868-09	FB_052413	05/28/13
BE31237-BLK1	Blank	05/28/13
BE31237-BS1	LCS	05/28/13
BE31237-BSD1	LCS Dup	05/28/13

Batch ID: BE31258 **Preparation Method:** EPA SW846-3510C Low Level **Prepared By:** TFD

YORK Sample ID	Client Sample ID	Preparation Date
13E0868-01	MW-8_052313	05/29/13
13E0868-02	DUP-1_052313	05/29/13
13E0868-03	MW-9_052313	05/29/13
13E0868-04	MW-6_052313	05/29/13
13E0868-05	MW-7_052313	05/29/13
13E0868-06	MW-3_052313	05/29/13
13E0868-07	MW-10_052313	05/29/13
13E0868-08	TRC-MW-3_052413	05/29/13
13E0868-09	FB_052413	05/29/13
BE31258-BLK1	Blank	05/29/13
BE31258-BLK1	Blank	05/29/13
BE31258-BS1	LCS	05/29/13
BE31258-BS2	LCS	05/29/13
BE31258-BS2	LCS	05/29/13
BE31258-BSD2	LCS Dup	05/29/13
BE31258-BSD2	LCS Dup	05/29/13

Batch ID: BE31278 **Preparation Method:** EPA 3510C **Prepared By:** KAM

YORK Sample ID	Client Sample ID	Preparation Date
13E0868-01	MW-8_052313	05/29/13
13E0868-02	DUP-1_052313	05/29/13
13E0868-03	MW-9_052313	05/29/13
13E0868-04	MW-6_052313	05/29/13
13E0868-05	MW-7_052313	05/29/13
13E0868-06	MW-3_052313	05/29/13
13E0868-07	MW-10_052313	05/29/13
13E0868-08	TRC-MW-3_052413	05/29/13
13E0868-09	FB_052413	05/29/13
BE31278-BLK1	Blank	05/29/13

BE31278-BS1	LCS	05/29/13
BE31278-BS2	LCS	05/29/13

Batch ID: BE31297 **Preparation Method:** EPA SW846-7470 **Prepared By:** AA

YORK Sample ID	Client Sample ID	Preparation Date
13E0868-01	MW-8_052313	05/29/13
13E0868-02	DUP-1_052313	05/29/13
13E0868-03	MW-9_052313	05/29/13
13E0868-04	MW-6_052313	05/29/13
13E0868-05	MW-7_052313	05/29/13
13E0868-06	MW-3_052313	05/29/13
13E0868-07	MW-10_052313	05/29/13
13E0868-08	TRC-MW-3_052413	05/29/13
13E0868-09	FB_052413	05/29/13
BE31297-BLK1	Blank	05/29/13
BE31297-BS1	LCS	05/29/13

Batch ID: BE31367 **Preparation Method:** EPA 3010A **Prepared By:** MW

YORK Sample ID	Client Sample ID	Preparation Date
13E0868-01	MW-8_052313	05/30/13
13E0868-02	DUP-1_052313	05/30/13
13E0868-03	MW-9_052313	05/30/13
13E0868-04	MW-6_052313	05/30/13
13E0868-05	MW-7_052313	05/30/13
13E0868-06	MW-3_052313	05/30/13
13E0868-07	MW-10_052313	05/30/13
13E0868-08	TRC-MW-3_052413	05/30/13
13E0868-09	FB_052413	05/30/13
BE31367-BLK1	Blank	05/30/13
BE31367-DUP1	Duplicate	05/30/13
BE31367-MS1	Matrix Spike	05/30/13
BE31367-SRM1	Reference	05/30/13
BE31367-SRM2	Reference	05/30/13

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31237 - EPA 5030B											
Blank (BE31237-BLK1)											Prepared & Analyzed: 05/28/2013
1,1,1,2-Tetrachloroethane	ND	5.0	ug/L								
1,1,1-Trichloroethane	ND	5.0	"								
1,1,2,2-Tetrachloroethane	ND	5.0	"								
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	ND	5.0	"								
1,1,2-Trichloroethane	ND	5.0	"								
1,1-Dichloroethane	ND	5.0	"								
1,1-Dichloroethylene	ND	5.0	"								
1,1-Dichloropropylene	ND	5.0	"								
1,2,3-Trichlorobenzene	ND	5.0	"								
1,2,3-Trichloropropane	ND	5.0	"								
1,2,4-Trichlorobenzene	ND	5.0	"								
1,2,4-Trimethylbenzene	ND	5.0	"								
1,2-Dibromo-3-chloropropane	ND	5.0	"								
1,2-Dibromoethane	ND	5.0	"								
1,2-Dichlorobenzene	ND	5.0	"								
1,2-Dichloroethane	ND	5.0	"								
1,2-Dichloropropane	ND	5.0	"								
1,3,5-Trimethylbenzene	ND	5.0	"								
1,3-Dichlorobenzene	ND	5.0	"								
1,3-Dichloropropane	ND	5.0	"								
1,4-Dichlorobenzene	ND	5.0	"								
2,2-Dichloropropane	ND	5.0	"								
2-Butanone	ND	5.0	"								
2-Chlorotoluene	ND	5.0	"								
4-Chlorotoluene	ND	5.0	"								
Acetone	ND	5.0	"								
Benzene	ND	5.0	"								
Bromobenzene	ND	5.0	"								
Bromochloromethane	ND	5.0	"								
Bromodichloromethane	ND	5.0	"								
Bromoform	ND	5.0	"								
Bromomethane	ND	5.0	"								
Carbon tetrachloride	ND	5.0	"								
Chlorobenzene	ND	5.0	"								
Chloroethane	ND	5.0	"								
Chloroform	ND	5.0	"								
Chloromethane	ND	5.0	"								
cis-1,2-Dichloroethylene	ND	5.0	"								
cis-1,3-Dichloropropylene	ND	5.0	"								
Dibromochloromethane	ND	5.0	"								
Dibromomethane	ND	5.0	"								
Dichlorodifluoromethane	ND	5.0	"								
Ethyl Benzene	ND	5.0	"								
Hexachlorobutadiene	ND	5.0	"								
Isopropylbenzene	ND	5.0	"								
Methyl tert-butyl ether (MTBE)	ND	5.0	"								
Methylene chloride	ND	5.0	"								
Naphthalene	2.7	5.0	"								
n-Butylbenzene	ND	5.0	"								
n-Propylbenzene	ND	5.0	"								
o-Xylene	ND	5.0	"								

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31237 - EPA 5030B											
Blank (BE31237-BLK1)								Prepared & Analyzed: 05/28/2013			
p- & m- Xylenes	ND	10	ug/L								
p-Isopropyltoluene	ND	5.0	"								
sec-Butylbenzene	ND	5.0	"								
Styrene	ND	5.0	"								
tert-Butylbenzene	ND	5.0	"								
Tetrachloroethylene	ND	5.0	"								
Toluene	ND	5.0	"								
trans-1,2-Dichloroethylene	ND	5.0	"								
trans-1,3-Dichloropropylene	ND	5.0	"								
Trichloroethylene	ND	5.0	"								
Trichlorofluoromethane	ND	5.0	"								
Vinyl Chloride	ND	5.0	"								
Xylenes, Total	ND	15	"								
Vinyl acetate	ND	5.0	"								
Surrogate: 1,2-Dichloroethane-d4	*47.8*		*"*	*50.0*		*95.7*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*49.4*		*"*	*50.0*		*98.9*	*63.5-145*				
Surrogate: Toluene-d8	*49.9*		*"*	*50.0*		*99.8*	*81.2-127*				
LCS (BE31237-BS1)								Prepared & Analyzed: 05/28/2013			
1,1,1,2-Tetrachloroethane	47		ug/L	50.0		93.8	82.3-130				
1,1,1-Trichloroethane	46		"	50.0		92.1	75.6-137				
1,1,2,2-Tetrachloroethane	53		"	50.0		105	71.3-131				
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	47		"	50.0		94.3	71.1-129				
1,1,2-Trichloroethane	49		"	50.0		97.5	74.5-129				
1,1-Dichloroethane	46		"	50.0		91.5	79.6-132				
1,1-Dichloroethylene	43		"	50.0		85.7	80.2-146				
1,1-Dichloropropylene	45		"	50.0		90.0	75-136				
1,2,3-Trichlorobenzene	45		"	50.0		91.0	66.1-136				
1,2,3-Trichloropropane	49		"	50.0		98.9	63-131				
1,2,4-Trichlorobenzene	45		"	50.0		89.8	70.6-136				
1,2,4-Trimethylbenzene	45		"	50.0		90.0	75.3-135				
1,2-Dibromo-3-chloropropane	63		"	50.0		126	58.9-140				
1,2-Dibromoethane	51		"	50.0		102	79-130				
1,2-Dichlorobenzene	47		"	50.0		93.2	76.1-122				
1,2-Dichloroethane	48		"	50.0		96.2	74.6-132				
1,2-Dichloropropane	51		"	50.0		103	76.9-129				
1,3,5-Trimethylbenzene	46		"	50.0		92.7	70.6-127				
1,3-Dichlorobenzene	46		"	50.0		91.7	77-124				
1,3-Dichloropropane	50		"	50.0		100	75.8-126				
1,4-Dichlorobenzene	46		"	50.0		91.2	76.6-125				
2,2-Dichloropropane	50		"	50.0		99.3	69-133				
2-Butanone	53		"	50.0		107	70-130				
2-Chlorotoluene	44		"	50.0		88.0	66.3-119				
4-Chlorotoluene	46		"	50.0		91.9	69.2-127				
Acetone	47		"	50.0		93.1	70-130				
Benzene	49		"	50.0		97.7	76.2-129				
Bromobenzene	47		"	50.0		94.6	71.3-123				
Bromochloromethane	53		"	50.0		105	70.8-137				
Bromodichloromethane	49		"	50.0		97.0	79.7-134				
Bromoform	50		"	50.0		99.4	70.5-141				
Bromomethane	37		"	50.0		73.0	43.9-147				
Carbon tetrachloride	46		"	50.0		92.5	78.1-138				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31237 - EPA 5030B											
LCS (BE31237-BS1)								Prepared & Analyzed: 05/28/2013			
Chlorobenzene	48		ug/L	50.0		95.0	80.4-125				
Chloroethane	42		"	50.0		83.6	55.8-140				
Chloroform	47		"	50.0		95.0	76.6-133				
Chloromethane	36		"	50.0		72.5	48.8-115				
cis-1,2-Dichloroethylene	50		"	50.0		100	75.1-128				
cis-1,3-Dichloropropylene	50		"	50.0		99.3	74.5-128				
Dibromochloromethane	50		"	50.0		99.4	79.8-134				
Dibromomethane	52		"	50.0		103	79-130				
Dichlorodifluoromethane	22		"	50.0		43.7	47.1-101	Low Bias			
Ethyl Benzene	48		"	50.0		95.3	80.8-128				
Hexachlorobutadiene	43		"	50.0		86.1	64.8-128				
Isopropylbenzene	46		"	50.0		91.9	75.5-135				
Methyl tert-butyl ether (MTBE)	50		"	50.0		100	65.1-140				
Methylene chloride	39		"	50.0		77.6	61.3-120				
Naphthalene	51		"	50.0		102	62.3-148				
n-Butylbenzene	44		"	50.0		87.3	67.2-123				
n-Propylbenzene	45		"	50.0		90.4	70.5-127				
o-Xylene	46		"	50.0		91.8	75.9-122				
p- & m- Xylenes	94		"	100		93.9	77.7-127				
p-Isopropyltoluene	45		"	50.0		90.3	75.6-129				
sec-Butylbenzene	46		"	50.0		92.4	71.5-125				
Styrene	49		"	50.0		97.4	77.8-123				
tert-Butylbenzene	46		"	50.0		92.5	75.9-151				
Tetrachloroethylene	47		"	50.0		93.6	63.6-167				
Toluene	48		"	50.0		95.3	77-123				
trans-1,2-Dichloroethylene	45		"	50.0		90.7	76.3-139				
trans-1,3-Dichloropropylene	49		"	50.0		98.0	72.5-137				
Trichloroethylene	47		"	50.0		93.5	77.9-130				
Trichlorofluoromethane	38		"	50.0		76.5	57.4-133				
Vinyl Chloride	37		"	50.0		73.5	54.9-124				
Vinyl acetate	41		"	50.0		81.8	70-130				
Surrogate: 1,2-Dichloroethane-d4	*49.9*		*"*	*50.0*		*99.9*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*49.6*		*"*	*50.0*		*99.2*	*63.5-145*				
Surrogate: Toluene-d8	*50.6*		*"*	*50.0*		*101*	*81.2-127*				

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31237 - EPA 5030B											
LCS Dup (BE31237-BSD1)								Prepared & Analyzed: 05/28/2013			
1,1,1,2-Tetrachloroethane	48		ug/L	50.0		95.1	82.3-130		1.38	21.1	
1,1,1-Trichloroethane	46		"	50.0		91.4	75.6-137		0.828	19.7	
1,1,2,2-Tetrachloroethane	53		"	50.0		106	71.3-131		0.379	20.8	
1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	48		"	50.0		96.6	71.1-129		2.45	21.7	
1,1,2-Trichloroethane	50		"	50.0		100	74.5-129		2.91	20.3	
1,1-Dichloroethane	47		"	50.0		93.3	79.6-132		1.90	20.6	
1,1-Dichloroethylene	44		"	50.0		87.3	80.2-146		1.83	20	
1,1-Dichloropropylene	45		"	50.0		90.4	75-136		0.355	19.3	
1,2,3-Trichlorobenzene	45		"	50.0		89.6	66.1-136		1.57	21.6	
1,2,3-Trichloropropane	48		"	50.0		96.0	63-131		2.93	23.9	
1,2,4-Trichlorobenzene	43		"	50.0		86.3	70.6-136		4.02	21.7	
1,2,4-Trimethylbenzene	44		"	50.0		88.4	75.3-135		1.79	18.8	
1,2-Dibromo-3-chloropropane	62		"	50.0		124	58.9-140		1.30	27.7	
1,2-Dibromoethane	50		"	50.0		100	79-130		1.56	23	
1,2-Dichlorobenzene	46		"	50.0		91.4	76.1-122		1.95	19.8	
1,2-Dichloroethane	48		"	50.0		95.6	74.6-132		0.605	20.2	
1,2-Dichloropropane	51		"	50.0		101	76.9-129		1.73	20.7	
1,3,5-Trimethylbenzene	44		"	50.0		89.0	70.6-127		4.12	18.9	
1,3-Dichlorobenzene	45		"	50.0		89.5	77-124		2.41	19.2	
1,3-Dichloropropane	52		"	50.0		103	75.8-126		3.15	22.1	
1,4-Dichlorobenzene	45		"	50.0		90.3	76.6-125		0.948	18.6	
2,2-Dichloropropane	49		"	50.0		97.4	69-133		1.95	19.8	
2-Butanone	58		"	50.0		116	70-130		8.08	30	
2-Chlorotoluene	44		"	50.0		87.9	66.3-119		0.0682	21.6	
4-Chlorotoluene	46		"	50.0		91.2	69.2-127		0.721	19	
Acetone	46		"	50.0		91.2	70-130		2.04	30	
Benzene	49		"	50.0		98.3	76.2-129		0.571	19	
Bromobenzene	47		"	50.0		94.5	71.3-123		0.0635	20.3	
Bromochloromethane	53		"	50.0		105	70.8-137		0.114	23.9	
Bromodichloromethane	49		"	50.0		98.1	79.7-134		1.11	21	
Bromoform	51		"	50.0		102	70.5-141		2.27	21.8	
Bromomethane	35		"	50.0		69.5	43.9-147		4.94	28.4	
Carbon tetrachloride	46		"	50.0		91.7	78.1-138		0.869	20.1	
Chlorobenzene	48		"	50.0		95.5	80.4-125		0.441	19.9	
Chloroethane	43		"	50.0		86.2	55.8-140		3.16	23.3	
Chloroform	48		"	50.0		96.3	76.6-133		1.38	20.3	
Chloromethane	37		"	50.0		73.6	48.8-115		1.56	24.5	
cis-1,2-Dichloroethylene	48		"	50.0		96.5	75.1-128		3.86	20.5	
cis-1,3-Dichloropropylene	51		"	50.0		102	74.5-128		2.37	19.9	
Dibromochloromethane	51		"	50.0		102	79.8-134		2.19	21.3	
Dibromomethane	52		"	50.0		105	79-130		1.27	22.4	
Dichlorodifluoromethane	22		"	50.0		43.5	47.1-101	Low Bias	0.413	23.9	
Ethyl Benzene	48		"	50.0		96.4	80.8-128		1.09	19.2	
Hexachlorobutadiene	42		"	50.0		83.6	64.8-128		2.99	20.6	
Isopropylbenzene	45		"	50.0		90.2	75.5-135		1.87	20	
Methyl tert-butyl ether (MTBE)	50		"	50.0		100	65.1-140		0.220	23.6	
Methylene chloride	39		"	50.0		78.9	61.3-120		1.64	20.4	
Naphthalene	50		"	50.0		101	62.3-148		1.07	27.1	
n-Butylbenzene	43		"	50.0		85.8	67.2-123		1.80	19.1	
n-Propylbenzene	45		"	50.0		90.5	70.5-127		0.111	23.4	
o-Xylene	46		"	50.0		92.3	75.9-122		0.608	19.3	

Volatile Organic Compounds by EPA SW846-8260B - Quality Control Data

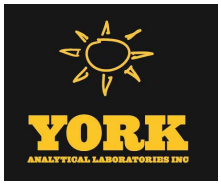
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31237 - EPA 5030B											
LCS Dup (BE31237-BSD1)							Prepared & Analyzed: 05/28/2013				
p- & m- Xylenes	93		ug/L	100		93.5	77.7-127		0.438	18.6	
p-Isopropyltoluene	44		"	50.0		88.3	75.6-129		2.33	19.1	
sec-Butylbenzene	45		"	50.0		90.4	71.5-125		2.17	18.9	
Styrene	49		"	50.0		97.1	77.8-123		0.329	20.9	
tert-Butylbenzene	45		"	50.0		90.3	75.9-151		2.36	20.9	
Tetrachloroethylene	47		"	50.0		94.3	63.6-167		0.766	27.7	
Toluene	48		"	50.0		96.1	77-123		0.773	18.7	
trans-1,2-Dichloroethylene	45		"	50.0		89.5	76.3-139		1.38	19.5	
trans-1,3-Dichloropropylene	49		"	50.0		98.3	72.5-137		0.346	19.3	
Trichloroethylene	47		"	50.0		93.1	77.9-130		0.429	20.5	
Trichlorofluoromethane	38		"	50.0		76.9	57.4-133		0.495	21.4	
Vinyl Chloride	38		"	50.0		76.2	54.9-124		3.58	22.3	
Vinyl acetate	44		"	50.0		87.5	70-130		6.69	30	
Surrogate: 1,2-Dichloroethane-d4	*50.6*		*"*	*50.0*		*101*	*72.6-129*				
Surrogate: p-Bromofluorobenzene	*48.6*		*"*	*50.0*		*97.3*	*63.5-145*				
Surrogate: Toluene-d8	*50.1*		*"*	*50.0*		*100*	*81.2-127*				

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31278 - EPA 3510C											
Blank (BE31278-BLK1)											
Prepared: 05/29/2013 Analyzed: 05/30/2013											
Acenaphthene	ND	0.0500	ug/L								
Acenaphthylene	ND	0.0500	"								
Aniline	ND	5.00	"								
Anthracene	ND	0.0500	"								
Benzo(a)anthracene	ND	0.0500	"								
Benzo(a)pyrene	ND	0.0500	"								
Benzo(b)fluoranthene	ND	0.0500	"								
Benzyl alcohol	ND	5.00	"								
Benzo(g,h,i)perylene	ND	0.0500	"								
Benzo(k)fluoranthene	ND	0.0500	"								
Benzyl butyl phthalate	ND	5.00	"								
4-Bromophenyl phenyl ether	ND	5.00	"								
4-Chloro-3-methylphenol	ND	5.00	"								
4-Chloroaniline	ND	5.00	"								
Bis(2-chloroethoxy)methane	ND	5.00	"								
Bis(2-chloroethyl)ether	ND	5.00	"								
Bis(2-chloroisopropyl)ether	ND	5.00	"								
Bis(2-ethylhexyl)phthalate	0.800	5.00	"								
2-Chloronaphthalene	ND	5.00	"								
2-Chlorophenol	ND	5.00	"								
4-Chlorophenyl phenyl ether	ND	5.00	"								
Chrysene	ND	0.0500	"								
Dibenzo(a,h)anthracene	ND	0.0500	"								
Dibenzofuran	ND	5.00	"								
Di-n-butyl phthalate	ND	5.00	"								
1,2-Dichlorobenzene	ND	5.00	"								
1,3-Dichlorobenzene	ND	5.00	"								
1,4-Dichlorobenzene	ND	5.00	"								
3,3'-Dichlorobenzidine	ND	5.00	"								
2,4-Dichlorophenol	ND	5.00	"								
Diethyl phthalate	ND	5.00	"								
2,4-Dimethylphenol	ND	5.00	"								
Dimethyl phthalate	ND	5.00	"								
4,6-Dinitro-2-methylphenol	ND	10.0	"								
2,4-Dinitrophenol	ND	10.0	"								
2,6-Dinitrotoluene	ND	5.00	"								
2,4-Dinitrotoluene	ND	5.00	"								
Di-n-octyl phthalate	ND	5.00	"								
Fluoranthene	ND	0.0500	"								
Fluorene	ND	0.0500	"								
Hexachlorobenzene	ND	5.00	"								
Hexachlorobutadiene	ND	5.00	"								
Hexachlorocyclopentadiene	ND	5.00	"								
Hexachloroethane	ND	5.00	"								
Indeno(1,2,3-cd)pyrene	ND	0.0500	"								
Isophorone	ND	5.00	"								
2-Methylnaphthalene	ND	5.00	"								
3- & 4-Methylphenols	ND	5.00	"								
2-Methylphenol	ND	5.00	"								
Naphthalene	ND	5.00	"								
4-Nitroaniline	ND	5.00	"								



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

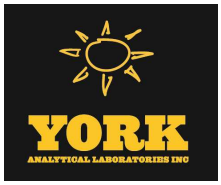
York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31278 - EPA 3510C											
Blank (BE31278-BLK1)								Prepared: 05/29/2013 Analyzed: 05/30/2013			
3-Nitroaniline	ND	5.00	ug/L								
2-Nitroaniline	ND	5.00	"								
Nitrobenzene	ND	5.00	"								
2-Nitrophenol	ND	5.00	"								
4-Nitrophenol	ND	5.00	"								
N-nitroso-di-n-propylamine	ND	5.00	"								
N-Nitrosodimethylamine	ND	5.00	"								
N-Nitrosodiphenylamine	ND	5.00	"								
Pentachlorophenol	ND	5.00	"								
Phenanthrene	ND	0.0500	"								
Phenol	ND	5.00	"								
Pyrene	ND	0.0500	"								
Pyridine	ND	5.00	"								
1,2,4-Trichlorobenzene	ND	5.00	"								
2,4,6-Trichlorophenol	ND	5.00	"								
2,4,5-Trichlorophenol	ND	5.00	"								
Surrogate: 2,4,6-Tribromophenol	*75.8*		*"*	*75.2*		*101*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*44.4*		*"*	*50.2*		*88.5*	*30-130*				
Surrogate: 2-Fluorophenol	*27.4*		*"*	*74.8*		*36.7*	*15-110*				
Surrogate: Nitrobenzene-d5	*40.8*		*"*	*49.9*		*81.7*	*30-130*				
Surrogate: Phenol-d5	*15.1*		*"*	*74.9*		*20.2*	*10-110*				
Surrogate: Terphenyl-d14	*58.2*		*"*	*50.0*		*116*	*30-130*				
LCS (BE31278-BS1)								Prepared: 05/29/2013 Analyzed: 05/30/2013			
Acenaphthene	44.1	0.0500	ug/L	50.0		88.2	30-140				
Acenaphthylene	41.9	0.0500	"	50.0		83.8	30-140				
Aniline	21.4	5.00	"	50.0		42.9	30-140				
Anthracene	48.3	0.0500	"	50.0		96.6	30-140				
Benzo(a)anthracene	47.7	0.0500	"	50.0		95.3	30-140				
Benzo(a)pyrene	53.0	0.0500	"	50.0		106	30-140				
Benzo(b)fluoranthene	46.2	0.0500	"	50.0		92.3	30-140				
Benzyl alcohol	21.2	5.00	"	50.0		42.4	30-130				
Benzo(g,h,i)perylene	16.4	0.0500	"	50.0		32.8	30-140				
Benzo(k)fluoranthene	48.3	0.0500	"	50.0		96.6	30-140				
Benzyl butyl phthalate	44.7	5.00	"	50.0		89.5	30-140				
4-Bromophenyl phenyl ether	51.0	5.00	"	50.0		102	30-140				
4-Chloro-3-methylphenol	35.6	5.00	"	50.0		71.2	30-130				
4-Chloroaniline	38.6	5.00	"	50.0		77.3	30-140				
Bis(2-chloroethoxy)methane	39.2	5.00	"	50.0		78.4	30-140				
Bis(2-chloroethyl)ether	34.8	5.00	"	50.0		69.6	30-140				
Bis(2-chloroisopropyl)ether	35.9	5.00	"	50.0		71.7	30-140				
Bis(2-ethylhexyl)phthalate	48.5	5.00	"	50.0		97.1	30-140				
2-Chloronaphthalene	40.5	5.00	"	50.0		80.9	30-140				
2-Chlorophenol	28.5	5.00	"	50.0		57.0	30-130				
4-Chlorophenyl phenyl ether	47.6	5.00	"	50.0		95.2	30-140				
Chrysene	48.3	0.0500	"	50.0		96.6	30-140				
Dibenzo(a,h)anthracene	31.0	0.0500	"	50.0		62.0	30-140				
Dibenzofuran	44.5	5.00	"	50.0		89.0	30-140				
Di-n-butyl phthalate	46.6	5.00	"	50.0		93.3	30-140				
1,2-Dichlorobenzene	31.9	5.00	"	50.0		63.9	30-140				
1,3-Dichlorobenzene	32.8	5.00	"	50.0		65.7	30-140				

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31278 - EPA 3510C											
LCS (BE31278-BS1)								Prepared: 05/29/2013 Analyzed: 05/30/2013			
1,4-Dichlorobenzene	33.2	5.00	ug/L	50.0		66.4	30-140				
3,3'-Dichlorobenzidine	54.7	5.00	"	50.0		109	30-140				
2,4-Dichlorophenol	37.3	5.00	"	50.0		74.7	30-130				
Diethyl phthalate	44.5	5.00	"	50.0		89.0	30-140				
2,4-Dimethylphenol	32.6	5.00	"	50.0		65.2	30-130				
Dimethyl phthalate	43.2	5.00	"	50.0		86.4	30-140				
4,6-Dinitro-2-methylphenol	52.9	10.0	"	50.0		106	30-130				
2,4-Dinitrophenol	48.6	10.0	"	50.0		97.1	30-130				
2,6-Dinitrotoluene	47.8	5.00	"	50.0		95.6	30-140				
2,4-Dinitrotoluene	44.7	5.00	"	50.0		89.5	30-140				
Di-n-octyl phthalate	45.2	5.00	"	50.0		90.4	30-140				
Fluoranthene	47.2	0.0500	"	50.0		94.5	30-140				
Fluorene	47.2	0.0500	"	50.0		94.5	30-140				
Hexachlorobenzene	47.6	5.00	"	50.0		95.2	30-140				
Hexachlorobutadiene	35.0	5.00	"	50.0		69.9	30-140				
Hexachlorocyclopentadiene	33.5	5.00	"	50.0		67.0	30-140				
Hexachloroethane	32.0	5.00	"	50.0		64.0	30-140				
Indeno(1,2,3-cd)pyrene	28.2	0.0500	"	50.0		56.5	30-140				
Isophorone	38.3	5.00	"	50.0		76.7	30-140				
2-Methylnaphthalene	37.7	5.00	"	50.0		75.3	30-140				
3- & 4-Methylphenols	21.0	5.00	"	50.0		42.1	30-130				
2-Methylphenol	24.3	5.00	"	50.0		48.7	30-130				
Naphthalene	37.7	5.00	"	50.0		75.5	30-140				
4-Nitroaniline	41.9	5.00	"	50.0		83.8	30-140				
3-Nitroaniline	44.2	5.00	"	50.0		88.5	30-140				
2-Nitroaniline	43.5	5.00	"	50.0		87.1	30-140				
Nitrobenzene	36.9	5.00	"	50.0		73.7	30-140				
2-Nitrophenol	35.8	5.00	"	50.0		71.7	30-130				
4-Nitrophenol	11.9	5.00	"	50.0		23.8	30-130	Low Bias			
N-nitroso-di-n-propylamine	41.5	5.00	"	50.0		83.0	30-140				
N-Nitrosodimethylamine	12.1	5.00	"	50.0		24.2	30-140	Low Bias			
N-Nitrosodiphenylamine	65.4	5.00	"	50.0		131	30-140				
Pentachlorophenol	49.6	5.00	"	50.0		99.3	30-130				
Phenanthrene	48.6	0.0500	"	50.0		97.2	30-140				
Phenol	9.58	5.00	"	50.0		19.2	30-130	Low Bias			
Pyrene	44.4	0.0500	"	50.0		88.7	30-140				
Pyridine	8.86	5.00	"	50.0		17.7	30-140	Low Bias			
1,2,4-Trichlorobenzene	35.9	5.00	"	50.0		71.8	30-140				
2,4,6-Trichlorophenol	42.8	5.00	"	50.0		85.6	30-130				
2,4,5-Trichlorophenol	42.0	5.00	"	50.0		84.0	30-130				
Surrogate: 2,4,6-Tribromophenol	*89.3*		*"*	*75.2*		*119*	*15-110*				
Surrogate: 2-Fluorobiphenyl	*42.1*		*"*	*50.2*		*83.8*	*30-130*				
Surrogate: 2-Fluorophenol	*23.6*		*"*	*74.8*		*31.5*	*15-110*				
Surrogate: Nitrobenzene-d5	*38.1*		*"*	*49.9*		*76.3*	*30-130*				
Surrogate: Phenol-d5	*13.2*		*"*	*74.9*		*17.7*	*10-110*				
Surrogate: Terphenyl-d14	*48.8*		*"*	*50.0*		*97.5*	*30-130*				



Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31278 - EPA 3510C											
LCS (BE31278-BS2)							Prepared & Analyzed: 05/29/2013				
Acenaphthene	0.590	0.0500	ug/L	1.00		59.0	30-140				
Acenaphthylene	0.610	0.0500	"	1.00		61.0	30-140				
Aniline	ND	5.00	"				30-140				
Anthracene	0.620	0.0500	"	1.00		62.0	30-140				
Benzo(a)anthracene	0.690	0.0500	"	1.00		69.0	30-140				
Benzo(a)pyrene	0.730	0.0500	"	1.00		73.0	30-140				
Benzo(b)fluoranthene	0.790	0.0500	"	1.00		79.0	30-140				
Benzyl alcohol	ND	5.00	"				30-130				
Benzo(g,h,i)perylene	0.840	0.0500	"	1.00		84.0	30-140				
Benzo(k)fluoranthene	0.720	0.0500	"	1.00		72.0	30-140				
Benzyl butyl phthalate	ND	5.00	"				30-140				
4-Bromophenyl phenyl ether	ND	5.00	"				30-140				
4-Chloro-3-methylphenol	ND	5.00	"				30-130				
4-Chloroaniline	ND	5.00	"				30-140				
Bis(2-chloroethoxy)methane	ND	5.00	"				30-140				
Bis(2-chloroethyl)ether	ND	5.00	"				30-140				
Bis(2-chloroisopropyl)ether	ND	5.00	"				30-140				
Bis(2-ethylhexyl)phthalate	ND	5.00	"				30-140				
2-Chloronaphthalene	ND	5.00	"				30-140				
2-Chlorophenol	ND	5.00	"				30-130				
4-Chlorophenyl phenyl ether	ND	5.00	"				30-140				
Chrysene	0.640	0.0500	"	1.00		64.0	30-140				
Dibenzo(a,h)anthracene	1.00	0.0500	"	1.00		100	30-140				
Dibenzofuran	ND	5.00	"				30-140				
Di-n-butyl phthalate	ND	5.00	"				30-140				
1,3-Dichlorobenzene	ND	5.00	"				30-140				
1,2-Dichlorobenzene	ND	5.00	"				30-140				
1,4-Dichlorobenzene	ND	5.00	"				30-140				
3,3'-Dichlorobenzidine	ND	5.00	"				30-140				
2,4-Dichlorophenol	ND	5.00	"				30-130				
Diethyl phthalate	ND	5.00	"				30-140				
2,4-Dimethylphenol	ND	5.00	"				30-130				
Dimethyl phthalate	ND	5.00	"				30-140				
4,6-Dinitro-2-methylphenol	ND	10.0	"				30-130				
2,4-Dinitrophenol	ND	10.0	"				30-130				
2,6-Dinitrotoluene	ND	5.00	"				30-140				
2,4-Dinitrotoluene	ND	5.00	"				30-140				
Di-n-octyl phthalate	ND	5.00	"				30-140				
Fluoranthene	0.570	0.0500	"	1.00		57.0	30-140				
Fluorene	0.660	0.0500	"	1.00		66.0	30-140				
Hexachlorobenzene	ND	5.00	"				30-140				
Hexachlorobutadiene	ND	5.00	"				30-140				
Hexachlorocyclopentadiene	ND	5.00	"				30-140				
Hexachloroethane	ND	5.00	"				30-140				
Indeno(1,2,3-cd)pyrene	1.06	0.0500	"	1.00		106	30-140				
Isophorone	ND	5.00	"				30-140				
2-Methylnaphthalene	ND	5.00	"				30-140				
3- & 4-Methylphenols	ND	5.00	"				30-130				
2-Methylphenol	ND	5.00	"				30-130				
Naphthalene	0.540	5.00	"	1.00		54.0	30-140				
4-Nitroaniline	ND	5.00	"				30-140				

Semivolatile Organic Compounds by EPA Method 8270C - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31278 - EPA 3510C											
LCS (BE31278-BS2)							Prepared & Analyzed: 05/29/2013				
3-Nitroaniline	ND	5.00	ug/L				30-140				
2-Nitroaniline	ND	5.00	"				30-140				
Nitrobenzene	ND	5.00	"				30-140				
2-Nitrophenol	ND	5.00	"				30-130				
4-Nitrophenol	ND	5.00	"				30-130				
N-nitroso-di-n-propylamine	ND	5.00	"				30-140				
N-Nitrosodimethylamine	ND	5.00	"				30-140				
N-Nitrosodiphenylamine	ND	5.00	"				30-140				
Pentachlorophenol	ND	5.00	"				30-130				
Phenanthrene	0.590	0.0500	"	1.00		59.0	30-140				
Phenol	ND	5.00	"				30-130				
Pyrene	0.700	0.0500	"	1.00		70.0	30-140				
Pyridine	ND	5.00	"				30-140				
1,2,4-Trichlorobenzene	ND	5.00	"				30-140				
2,4,6-Trichlorophenol	ND	5.00	"				30-130				
2,4,5-Trichlorophenol	ND	5.00	"				30-130				
Surrogate: 2,4,6-Tribromophenol	*0.00*		*"*	*75.2*			*15-110*				
Surrogate: 2-Fluorobiphenyl	*0.00*		*"*	*50.2*			*30-130*				
Surrogate: 2-Fluorophenol	*0.00*		*"*	*74.8*			*15-110*				
Surrogate: Nitrobenzene-d5	*0.00*		*"*	*49.9*			*30-130*				
Surrogate: Phenol-d5	*0.00*		*"*	*74.9*			*10-110*				
Surrogate: Terphenyl-d14	*0.00*		*"*	*50.0*			*30-130*				

Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31258 - EPA SW846-3510C Low Level											
Blank (BE31258-BLK1)									Prepared: 05/29/2013 Analyzed: 05/31/2013		
Toxaphene	ND	0.0500	ug/L								
Methoxychlor	ND	0.00500	"								
Heptachlor epoxide	ND	0.00100	"								
Heptachlor	ND	0.00100	"								
gamma-BHC (Lindane)	ND	0.00100	"								
Endrin ketone	ND	0.00100	"								
Endrin aldehyde	ND	0.00100	"								
Endrin	ND	0.00100	"								
Endosulfan sulfate	ND	0.00100	"								
Endosulfan II	ND	0.00100	"								
Endosulfan I	ND	0.00100	"								
Dieldrin	ND	0.00100	"								
delta-BHC	ND	0.00100	"								
Chlordane, total	ND	0.00400	"								
beta-BHC	ND	0.00100	"								
alpha-BHC	ND	0.00100	"								
Aldrin	ND	0.00100	"								
4,4'-DDT	ND	0.00100	"								
4,4'-DDE	ND	0.00100	"								
4,4'-DDD	ND	0.00100	"								
Aroclor 1260	ND	0.0500	"								
Aroclor 1254	ND	0.0500	"								
Aroclor 1248	ND	0.0500	"								
Aroclor 1242	ND	0.0500	"								
Aroclor 1232	ND	0.0500	"								
Aroclor 1221	ND	0.0500	"								
Aroclor 1016	ND	0.0500	"								
Total PCBs	ND	0.0500	"								
Surrogate: Tetrachloro-m-xylene	*0.127*		*"*	*0.200*		*63.3*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.169*		*"*	*0.201*		*83.9*	*30-150*				

Organochlorine Pesticides by EPA SW 846-8081 - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31258 - EPA SW846-3510C Low Level											
LCS (BE31258-BS1)								Prepared: 05/29/2013 Analyzed: 05/31/2013			
Methoxychlor	0.0740	0.00500	ug/L	0.100		74.0	40-140				
Heptachlor epoxide	0.0599	0.00100	"	0.100		59.9	40-140				
Heptachlor	0.0591	0.00100	"	0.100		59.1	40-140				
gamma-BHC (Lindane)	0.0571	0.00100	"	0.100		57.1	40-140				
Endrin ketone	0.0718	0.00100	"	0.100		71.8	40-140				
Endrin aldehyde	0.0662	0.00100	"	0.100		66.2	40-140				
Endrin	0.0669	0.00100	"	0.100		66.9	40-140				
Endosulfan sulfate	0.0700	0.00100	"	0.100		70.0	40-140				
Endosulfan II	0.0638	0.00100	"	0.100		63.8	40-140				
Endosulfan I	0.0639	0.00100	"	0.100		63.9	40-140				
Dieldrin	0.0631	0.00100	"	0.100		63.1	40-140				
delta-BHC	0.0678	0.00100	"	0.100		67.8	40-140				
beta-BHC	0.0587	0.00100	"	0.100		58.7	40-140				
alpha-BHC	0.0585	0.00100	"	0.100		58.5	40-140				
Aldrin	0.0569	0.00100	"	0.100		56.9	40-140				
4,4'-DDT	0.0801	0.00100	"	0.100		80.1	40-140				
4,4'-DDE	0.0634	0.00100	"	0.100		63.4	40-140				
4,4'-DDD	0.0734	0.00100	"	0.100		73.4	40-140				
Surrogate: Tetrachloro-m-xylene	*0.0988*		*"*	*0.200*		*49.4*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.154*		*"*	*0.201*		*76.4*	*30-150*				
LCS (BE31258-BS2)								Prepared: 05/29/2013 Analyzed: 05/30/2013			
Aroclor 1260	0.784	0.0500	ug/L	1.00		78.4	40-140				
Aroclor 1016	0.733	0.0500	"	1.00		73.3	40-140				
Surrogate: Tetrachloro-m-xylene	*0.116*		*"*	*0.200*		*58.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.132*		*"*	*0.201*		*65.7*	*30-150*				
LCS Dup (BE31258-BSD2)								Prepared: 05/29/2013 Analyzed: 05/30/2013			
Aroclor 1260	0.806	0.0500	ug/L	1.00		80.6	40-140		2.72	200	
Aroclor 1016	0.769	0.0500	"	1.00		76.9	40-140		4.79	200	
Surrogate: Tetrachloro-m-xylene	*0.120*		*"*	*0.200*		*60.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.138*		*"*	*0.201*		*68.7*	*30-150*				

Polychlorinated Biphenyls (PCB) by EPA SW 846-8082/EPA Compendium Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31258 - EPA SW846-3510C Low Level											
Blank (BE31258-BLK1)									Prepared: 05/29/2013 Analyzed: 05/30/2013		
Aroclor 1016	ND	0.0500	ug/L								
Aroclor 1221	ND	0.0500	"								
Aroclor 1232	ND	0.0500	"								
Aroclor 1242	ND	0.0500	"								
Aroclor 1248	ND	0.0500	"								
Aroclor 1254	ND	0.0500	"								
Aroclor 1260	ND	0.0500	"								
Total PCBs	ND	0.0500	"								
Surrogate: Tetrachloro-m-xylene	*0.122*		*"*	*0.200*		*61.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.131*		*"*	*0.201*		*65.2*	*30-150*				
LCS (BE31258-BS2)									Prepared: 05/29/2013 Analyzed: 05/30/2013		
Aroclor 1016	0.733	0.0500	ug/L	1.00		73.3	40-140				
Aroclor 1260	0.784	0.0500	"	1.00		78.4	40-140				
Surrogate: Tetrachloro-m-xylene	*0.116*		*"*	*0.200*		*58.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.132*		*"*	*0.201*		*65.7*	*30-150*				
LCS Dup (BE31258-BSD2)									Prepared: 05/29/2013 Analyzed: 05/30/2013		
Aroclor 1016	0.769	0.0500	ug/L	1.00		76.9	40-140		4.79	200	
Aroclor 1260	0.806	0.0500	"	1.00		80.6	40-140		2.72	200	
Surrogate: Tetrachloro-m-xylene	*0.120*		*"*	*0.200*		*60.0*	*30-150*				
Surrogate: Decachlorobiphenyl	*0.138*		*"*	*0.201*		*68.7*	*30-150*				

Metals by EPA 6000 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31367 - EPA 3010A											
Blank (BE31367-BLK1)									Prepared & Analyzed: 05/30/2013		
Aluminum	ND	10	ug/L								
Antimony	ND	5	"								
Arsenic	ND	4	"								
Barium	ND	10	"								
Beryllium	ND	1	"								
Cadmium	ND	3	"								
Calcium	ND	50	"								
Chromium	ND	5	"								
Cobalt	ND	5	"								
Copper	ND	5	"								
Iron	ND	20	"								
Lead	ND	3	"								
Magnesium	ND	50	"								
Manganese	ND	5	"								
Nickel	ND	5	"								
Potassium	ND	50	"								
Selenium	ND	10	"								
Silver	ND	5	"								
Sodium	ND	100	"								
Thallium	ND	10	"								
Vanadium	ND	10	"								
Zinc	ND	20	"								
Duplicate (BE31367-DUP1)	*Source sample: 13E0868-01 (MW-8_052313)								Prepared & Analyzed: 05/30/2013		
Aluminum	96	10	ug/L		96				0.323	20	
Antimony	ND	5	"		ND					20	
Arsenic	ND	4	"		ND					20	
Barium	91	10	"		90				0.908	20	
Beryllium	ND	1	"		ND					20	
Cadmium	ND	3	"		ND					20	
Calcium	137000	50	"		137000				0.155	20	
Chromium	ND	5	"		ND					20	
Cobalt	ND	5	"		ND					20	
Copper	3	5	"		3				4.74	20	
Iron	138	20	"		144				4.24	20	
Lead	4	3	"		3				42.0	20	Non-dir.
Magnesium	25500	50	"		25500				0.0806	20	
Manganese	1670	5	"		1660				0.732	20	
Nickel	4	5	"		5				14.0	20	
Potassium	13000	50	"		13100				1.02	20	
Selenium	ND	10	"		ND					20	
Silver	ND	5	"		ND					20	
Sodium	59800	100	"		59500				0.429	20	
Thallium	ND	10	"		ND					20	
Vanadium	ND	10	"		ND					20	
Zinc	30	20	"		29				1.27	20	

Metals by EPA 6000 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31367 - EPA 3010A											
Matrix Spike (BE31367-MS1)	*Source sample: 13E0868-01 (MW-8_052313)							Prepared & Analyzed: 05/30/2013			
Antimony	261	5	ug/L	250	ND	104	75-125				
Arsenic	2210	4	"	2000	ND	111	75-125				
Barium	2190	10	"	2000	90	105	75-125				
Beryllium	51	1	"	50.0	ND	103	75-125				
Cadmium	53	3	"	50.0	ND	105	75-125				
Chromium	204	5	"	200	ND	102	75-125				
Cobalt	523	5	"	500	ND	105	75-125				
Copper	261	5	"	250	3	103	75-125				
Iron	1180	20	"	1000	144	103	75-125				
Lead	517	3	"	500	3	103	75-125				
Manganese	2180	5	"	500	1660	105	75-125				
Nickel	530	5	"	500	5	105	75-125				
Selenium	2310	10	"	2000	ND	116	75-125				
Silver	45	5	"	50.0	ND	90.5	75-125				
Thallium	2080	10	"	2000	ND	104	75-125				
Vanadium	513	10	"	500	ND	103	75-125				
Zinc	543	20	"	500	29	103	75-125				
Reference (BE31367-SRM1)								Prepared & Analyzed: 05/30/2013			
Aluminum	326	10	ug/L	292		112	72.6-129				
Antimony	593	5	"	686		86.4	70.6-120				
Arsenic	167	4	"	182		91.9	81.9-118				
Barium	2140	10	"	2080		103	87-113				
Beryllium	164	1	"	169		97.0	84.6-113				
Cadmium	385	3	"	393		97.9	85.2-114				
Chromium	602	5	"	611		98.5	87.1-113				
Cobalt	292	5	"	290		101	87.6-112				
Copper	567	5	"	569		99.6	90-110				
Iron	455	20	"	462		98.5	87.9-114				
Lead	262	3	"	259		101	85.7-114				
Manganese	1310	5	"	1280		102	89.8-111				
Nickel	303	5	"	279		109	88.5-113				
Selenium	973	10	"	1050		92.7	79.5-116				
Silver	311	5	"	333		93.3	85.9-115				
Thallium	505	10	"	487		104	80.1-120				
Vanadium	434	10	"	455		95.4	87.5-112				
Zinc	181	20	"	191		94.6	84.8-118				

Metals by EPA 6000 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31367 - EPA 3010A											
Reference (BE31367-SRM2)								Prepared & Analyzed: 05/30/2013			
Calcium	63900	50	ug/L	62700		102	86-114				
Magnesium	30100	50	"	29000		104	86.2-114				
Potassium	35300	50	"	32400		109	85.2-115				
Sodium	88000	100	"	85100		103	85-115				

Mercury by EPA 7000/200 Series Methods - Quality Control Data

York Analytical Laboratories, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source* Result	%REC	%REC Limits	Flag	RPD	RPD Limit	Flag
Batch BE31297 - EPA SW846-7470											
Blank (BE31297-BLK1)									Prepared: 05/29/2013 Analyzed: 05/30/2013		
Mercury	ND	0.2	ug/L								
LCS (BE31297-BS1)									Prepared: 05/29/2013 Analyzed: 05/30/2013		
Mercury	2.327	0.2	ug/L	2.00		116	80-120				

Volatile Analysis Sample Containers

Lab ID	Client Sample ID	Volatile Sample Container
13E0868-01	MW-8_052313	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-02	DUP-1_052313	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-03	MW-9_052313	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-04	MW-6_052313	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-05	MW-7_052313	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-06	MW-3_052313	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-07	MW-10_052313	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-08	TRC-MW-3_052413	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C
13E0868-09	FB_052413	40mL Clear Vial (pre-pres.) HCl; Cool to 4° C

Notes and Definitions

U	Analyte included in the analysis, but not detected
S-AC	Acid surrogate recovery outside of control limits. The data was accepted based on valid recovery of remaining two acid surrogates.
QL-02	This LCS analyte is outside Laboratory Recovery limits due the analyte behavior using the referenced method. The reference method has certain limitations with respect to analytes of this nature.
J	Detected below the Reporting Limit but greater than or equal to the Method Detection Limit (MDL); therefore, the result is an estimated concentration.
B	Analyte is found in the associated analysis batch blank. For volatiles, methylene chloride and acetone are common lab contaminants. Data users should consider anything <10x the blank value as artifact.

ND	Analyte NOT DETECTED at the stated Reporting Limit (RL) or above.
RL	REPORTING LIMIT - the minimum reportable value based upon the lowest point in the analyte calibration curve.
MDL	METHOD DETECTION LIMIT - the minimum concentration that can be measured and reported with a 99% confidence that the concentration is greater than zero. If requested or required, a value reported below the RL and above the MDL is considered estimated and is noted with a "J" flag.
NR	Not reported
RPD	Relative Percent Difference
Wet	The data has been reported on an as-received (wet weight) basis
Low Bias	Low Bias flag indicates that the recovery of the flagged analyte is below the laboratory or regulatory lower control limit. The data user should take note that this analyte may be biased low but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
High Bias	High Bias flag indicates that the recovery of the flagged analyte is above the laboratory or regulatory upper control limit. The data user should take note that this analyte may be biased high but should evaluate multiple lines of evidence including the LCS and site-specific MS/MSD data to draw bias conclusions. In cases where no site-specific MS/MSD was requested, only the LCS data can be used to evaluate such bias.
Non-Dir.	Non-dir. flag (Non-Directional Bias) indicates that the Relative Percent Difference (RPD) (a measure of precision) among the MS and MSD data is outside the laboratory or regulatory control limit. This alerts the data user where the MS and MSD are from site-specific samples that the RPD is high due to either non-homogeneous distribution of target analyte between the MS/MSD or indicates poor reproducibility for other reasons.

If EPA SW-846 method 8270 is included herein it is noted that the target compound N-nitrosodiphenylamine (NDPA) decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine (DPA). These results could actually represent 100% DPA, 100% NDPA or some combination of the two. For this reason, York reports the combined result for n-nitrosodiphenylamine and diphenylamine for either of these compounds as a combined concentration as Diphenylamine.

If Total PCBs are detected and the target aroclors reported are "Not detected", the Total PCB value is reported due to the presence of either or both Aroclors 1262 and 1268 which are non-target aroclors for some regulatory lists.

2-chloroethylvinyl ether readily breaks down under acidic conditions. Samples that are acid preserved, including standards will exhibit breakdown. The data user should take note.

Certification for pH is no longer offered by NYDOH ELAP.

Semi-Volatile and Volatile analyses are reported down to the MDL, with values between the MDL and the RL being "J" flagged as estimated results.

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FAX (203) 357-0166

Field Chain-of-Custody Record

NOTE: York's Std. Terms & Conditions are listed on the back side of this document. This document serves as your written authorization to York to proceed with the analyses requested and your signature binds you to York's Std. Terms & Conditions.

York Project No. 13E0868

YOUR Information

Company: Langan
Address: 360 W 31st St New York, NY
Phone No. (212) 479-5400
Contact Person: Tracy Cam-Spiros
E-Mail Address: tcamspiros@langan.com

Report To:

Company:
Address: same
Phone No.
Attention: Paul McMahon
E-Mail Address: pmmahon@langan.com

Invoice To:

Company:
Address: same
Phone No.
Attention:
E-Mail Address:

YOUR Project ID

170246501

Purchase Order No.

Samples from: CT ___ NY ✓ NJ ___

Turn-Around Time

- RUSH - Same Day
- RUSH - Next Day
- RUSH - Two Day
- RUSH - Three Day
- RUSH - Four Day ✓
- Standard(5-7 Days)

Report Type

- Summary Report ✓
- Summary w/ QA Summary
- CT RCP Package
- CTRCP DQA/DUE Pkg
- NY ASP A Package
- NY ASP B Package ✓
- NJDEP Red. Deliv.

Electronic Data Deliverables (EDD)

- Simple Excel
- NYSDEC EQuIS ✓
- EQuIS (std)
- EZ-EDD (EQuIS)
- NJDEP SRP HazSite EDD
- GIS KEY (std)
- Other
- **York Regulatory Comparison**
- **Excel Spreadsheet** ✓

Compare to the Following Regs: please circle: nysdec TOGS

Print Clearly and Legibly. All Information must be complete. Samples will NOT be logged in and the turn-around time clock will not begin until any questions by York are resolved.

Samples Collected/Authorized By (Signature)

Name (printed)

Matrix Codes
S - soil
Other - specify (oil, etc.)
WW - wastewater
GW - groundwater
DW - drinking water
Air-A - ambient air
Air-SV - soil vapor

Volatiles		Semi-Vols.	Pest/PCB/Herb	Metals	Misc. Org.	Full Lists	Misc.
8260 full	TICs	8270 or 625	8082PCB	RCRAS	TPH GRO	Pri.Poll.	Corrosivity
624	Site Spec	STARS list	8081Pest	PP13 list	TPH DRO	TCL Organics	Reactivity
STARS list	Nassau Co.	BN Only	8151Herb	TAL	CT ETPH	TAL Met/CN	Ignitability
BTEX	Suffolk Co.	Acids Only	CT RCP	CT15 list	NY 310-13	Full TCLP	Flash Point
MTBE	Ketones	PAH list	App. IX	TAGM list	TPH 1664	Full App. IX	Sieve Anal.
TCL list	Oxygenates	TAGM list	Site Spec.	NJDEP list	Air TO14A	Part 360-Routine	Heterotrophs
TAGM list	TCLP list	CT RCP list	SPLP or TCLP	Total	Air TO15	Part 360-Bacteria	TOX
CT RCP list	524.2	TCL list	TCLP Pest	Dissolved	Air STARS	Part 360-Sporulating Bacteria	BTU lb.
Arom. only	502.2	NJDEP list	TCLP Herb	SPLP or TCLP	Air VPH	Part 360-Fungus	Aquatic Tox.
Halog.only	NJDEP list	App. IX	Chlordane	Indiv. Metals	Air TICs	NYCDEP Sewer	TOC
App.IX list	SPLP or TCLP	TCLP BNA	608 Pest	LIST Below	Methane	NYSDEC Sewer	Asbestos
8021B list		SPLP or TCLP	608 PCB		Helium	TAGM	Silica

Sample Identification	Date/Time Sampled	Sample Matrix	Choose Analyses Needed from the Menu Above and Enter Below	Container Description(s)
MW-8_052313	05/23/13 14:32	GW	8260B VOC, 8270C SVOC, 8082 PCBs, TAL Metals	2 1L Ambers, 3 (HCl) VOAs, 1-500mL Plastic
DUP-1_052313	05/23/13	GW	8260B VOC, 8270C SVOC, 8082 PCBs, 8081 PEST, TAL Metals	3-1L Ambers, 3 VOAs, 1-500mL Plastic
MW-9_052313	05/23/13 8:55	GW		
MW-6_052313	05/23/13 10:00	GW		
MW-7_052313	05/23/13 10:30	GW		
MW-3_052313	05/23/13 12:20	GW		
MW-10_052313	05/23/13 16:20	GW		3-1L Ambers, 2 VOAs, 1-500mL Plastic
~~DUP~~ TRC-MW-3_052413	05/24/13 10:20	GW		3-1L Ambers, 2 VOAs, 1-500mL Plastic
FB_052413	05/24/13 9:20	GW		

Comments

Preservation (Check those Applicable): 4°C ✓ Frozen ___ HCl ✓ MeOH ___ HNO3 ✓ H2SO4 ___ NaOH ___ ZnAc ___ Ascorbic Acid ___ Other ___

Special Instructions

Field Filtered

Lab to Filter

Samples Relinquished By	Date/Time	Samples Received By	Date/Time
[signature]	05/24/13 12:53	[signature]	5/24 12:53
Samples Relinquished By	Date/Time	Samples Received in LAB By	Date/Time
			5/24/13 1740

Temperature on Receipt 3.6 °C

LIMITED HAZARDOUS BUILDING MATERIALS SURVEY REPORT

For

KINGSBRIDGE ARMORY
1 WEST KINGSBRIDGE ROAD
BRONX, NEW YORK 10468
(Block: 3247, Lot: 10)

Prepared For:

GILBANE BUILDING COMPANY
Wall Street Plaza
27th Floor
New York, New York 10005

Prepared By:

Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology, D.P.C.
21 Penn Plaza
360 West 31st Street, 8th Floor
New York, New York 10001



Miroslaw Baran
NYCDEP Certified Asbestos Investigator

Vijay Patel
Senior Associate

November 8, 2019
Langan Project No. 170321307

LANGAN

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Appendix B **Langan's Certifications and Laboratory Accreditations**
Appendix C **October 6, 2008 Asbestos Investigation Report by Langan**
Appendix D **August 24, 2000 Environmental Investigation Report by ET Environmental Corporation (ET)**

ACRONYMS

USEPA	United States Environmental Protection Agency
NYSDOL	New York State Department of Labor
NYCDEP	New York City Department of Environmental Protection
AHERA	Asbestos Hazard Emergency Response Act
OSHA	Occupational Safety and Health Administration
CAA	Clean Air Act
TSCA	Toxic Substance Control Act
CFR	Code of Federal Regulation
EPA	United States Environmental Protection Agency
NYSELAP	New York State Environmental Laboratory Accreditation Program
HEPA	High Efficiency Particulate Air
HUD	Housing and Urban Development
NESHAPS	National Standards for Hazardous Air Pollutants
RCRA	Resource Conservation and Recovery Act
PLM	Polarized Light Microscopy
TEM	Transmission Electron Microscopy
ACM	Asbestos-Containing Materials
LCP	Lead-Containing Paint
PCBs	Polychlorinated Biphenyls (PCBs)
SF	square Feet
LF	Linear Feet
mg/cm^2	Milligrams per square centimeter
PPM	Parts Per Million
XRF	X-ray Fluorescence
AAS	Atomic Absorption Spectrometry
TCLP	Toxicity Characteristic Leaching Procedure

EXECUTIVE SUMMARY

This report by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) presents the findings of Hazardous building materials (Hazmat) identified at the Kingsbridge Armory located at 1 West Kingsbridge Road, Bronx, New York 10468 (Block: 3247, Lot: 10). The objective of this Hazmat Survey was to identify the presence/absence of asbestos-containing materials (ACM), lead containing paint (LCP), and universal/hazardous waste articles. The survey was limited to the building interiors. Suspect materials located on exterior elevations and roofs were excluded from the scope of work.

PROJECT INFORMATION:

Client Name:	Gilbane Building Company	Survey Dates:	October 23 & 25, 2019
Professional's Project #:	1707321307	Construction Dates:	1913
Professional's Project Manager:	Vijay Patel	No. of Building(s):	1
Phone No.:	973.560.4983	No. of Stories:	9 Levels, including Mezzanines, sub-basement, basement, and Towers.
Email:	vpatel@langan.com	Estimated Gross Footage:	Over 385,600 SF
Property Address:	Kingsbridge Armory 1 West Kingsbridge Road Bronx, New York 10468 (Block: 3247, Lot: 10)	Property Use:	Vacant

The following is a summary of ACM, LCP and other universal/miscellaneous hazardous articles identified in the building:

Asbestos-Containing Materials (ACM)

The following ACM and Assumed ACM materials were identified within the interiors of the Armory:

Material	Survey Results	Estimated Quantity
Block/air-cell pipe & joint insulation	ACM	6,250 LF
Concealed block and air-cell pipe insulation	ACM	7,100 LF
Pipe insulation debris	ACM	2,280 SF

Material	Survey Results	Estimated Quantity
Loose ACM contaminated construction & household debris	ACM	59,195 SF
Bags with ACM contaminated construction & household debris	ACM	90 CY
VAT & mastic	ACM	16,310 SF
VAT & mastic (damaged) & ACM contaminated construction & household debris	ACM	14,015 SF
Electrical wire insulation	ACM	46,250 SF
Mastic, flashing materials and caulking on gable ends and clerestory bands and contaminated panels	ACM	12,000 SF
Door caulk	ACM	60 SF
Ebony/Transite with electrical box	ACM	187 SF
Mirror glue	ACM	20 SF
Wall panel glue	ACM	1,750 SF

Most of the ACM was in damaged condition. Refer to Table 1 for a summary of asbestos survey findings.

Lead Containing Paint (LCP)

As per 40 CFR Part 745, TSCA, Title IV (Lead Exposure Reduction), the term "lead containing paint" means paint or other surface coatings that contain lead in excess of 1.0 milligrams per centimeter (mg/cm^2) or 0.5 percent by weight. Painted surfaces at the Armory were previously tested for lead and documented in 2000 Environmental Corporation (ET) report. Limited testing of lead in painted surfaces was performed by Langan during our recent site visits.

The vast majority of painted building components were identified to contain lead in excess of 1.0 milligrams per centimeter (mg/cm^2). Refer to Table 2 for the testing conducted by Langan, and Attachment D for a copy of XRF screening data documented in ET report.

Universal and Hazardous Waste Articles

Universal waste and hazardous waste articles consisting of fluorescent light ballasts, fluorescent light bulbs, MEC thermostat, high intensity discharge (HID), mercury containing equipment, batteries, and miscellaneous chemicals, etc. were identified in the building. The lamp ballasts/capacitors were assumed to contain Polychlorinated Biphenyls (PCBs) and/or di (2) ethylhexyl phthalate (DEHP) based on the information observed on labels or markings. The

inspection did not include sampling and analysis for waste classification, confirmation or identification purposes. Refer to Table 3 for an inventory of these materials.

1.0 INTRODUCTION

This report by Langan Engineering, Environmental, Surveying, Landscape Architecture and Geology, D.P.C. (Langan) presents the findings of Hazardous building materials (Hazmat) identified at the Kingsbridge Armory located at 1 West Kingsbridge Road, Bronx, New York 10468 (Block: 3247, Lot: 10). The objective of this Hazmat Survey was to identify the presence/absence of asbestos-containing materials (ACM), lead containing paint (LCP), and universal/hazardous waste articles. The survey was limited to the building interiors. Suspect materials located on exterior elevations and roofs were excluded from the scope of work.

The remainder of this report presents our observations, findings, laboratory test results, plans showing sampling locations, and an itemized inventory of hazmat identified within the Armory.

2.0 SURVEY METHODOLOGY

Asbestos-Containing Materials

The asbestos survey was conducted in accordance with EPA protocol outlined in the EPA publication "Asbestos in Buildings". Suspect ACM was visually identified during a room-by-room, floor-by-floor survey of the buildings. Suspect ACM was categorized into various homogeneous materials and types, and sampled and analyzed for asbestos content. Sampling and analysis was conducted in accordance with EPA protocol 600/M4-82-020 per 40 CFR 763. Samples collected were properly packaged in individual containers, sealed; catalogued and chain-of-custody documentation was completed. Quantities of suspect materials were recorded and observations such as physical condition and friability of the materials were also noted. Samples were analyzed by AmeriSci laboratories.

Lead-Containing Paint Screening

A Heuresis Pb200i X-Ray Fluorescence (XRF) Spectrum Analyzer was used to test painted surfaces for lead. The Heuresis Pb200i analyzer uses a cobalt 57 radioactive

source and an advanced solid-state radiation detector to generate an x-ray fluorescence spectrum of a painted surface. During the analysis, the intensity of the x-rays is converted by the instrument's internal software into an estimate of the concentration of lead in the substance being analyzed. The results are interpreted as concentrations of lead in milligrams per square centimeter (mg/cm^2). This device is a field-screening tool, used to collect multiple readings in a short period of time. The method of measurement is based on spectrometric analysis of lead x-ray fluorescence within a controlled depth of interrogation. The reading is an estimate of lead content in all layers of paint.

Universal/Hazardous Waste Articles

As mandated by Subtitle C of the Resource Conservation and Recovery Act (RCRA), EPA promulgated hazardous waste regulations in 1980 to ensure that wastes which pose a threat to human health and the environment should be managed safely. Any waste within a building that makes it potentially harmful to human health or the environment is considered as a hazardous waste. Hazardous wastes are divided into listed wastes, characteristic wastes, universal wastes, and mixed wastes. The survey included preparing an inventory of universal and hazmat waste articles.

3.0 ASBESTOS CONTAINING MATERIALS

3.1 Terminology

Suspect Asbestos-Containing Materials

Asbestos has historically been used in certain types of construction and building materials. Until a material is examined using light microscopy or a similar technique, the building material is considered to be a suspect asbestos-containing material. A few examples of these materials include floor tiles, ceiling panels, thermal system insulation, fireproofing insulation, roofing materials, etc. Any suspect ACM of unknown asbestos content (that is not tested) should be handled as if it were an asbestos-containing material.

Asbestos–Containing Material

A material with an asbestos concentration greater than one percent by weight is considered to be asbestos-containing by the United States Environmental Protection Agency (USEPA). Thus, a material which contains asbestos in concentrations greater

than 1% by weight is considered as "positive" while materials that do not contain asbestos or asbestos is detected in concentrations less than one percent by weight are considered as "negative".

3.2 Files Review

Prior to conducting site survey, we reviewed the following pertinent reports for Armory:

1. October 6, 2008 Asbestos Investigation Report prepared by Langan
2. August 24, 2000 Environmental Investigation Report prepared by ET Environmental Corporation (ET) for subject building.

The reports reviewed documented presence of the following ACM in the Armory:

- various types of floor tiles/mastic (9-inch square beige floor tile and associated mastic, Black floor tile and associated mastic under plywood, 12-inch square tan wood design floor tile and associated mastic, 12-inch square terracotta floor tile and associated mastic, and Mastic associated with various 9-inch square floor tiles),
- pipe insulation debris mixed with plaster, wood and other construction debris
- air-cell and magnesia pipe and pipe joint insulation and mud-pack pipe joint insulation associated with fiberglass pipe insulation,
- wire wrap insulation,
- electric Transite switch panel,
- wall panel glue,
- mirror glue,
- interior door caulk

In addition to ACM, the vast majority of the painted building components were identified to contain lead in excess of 1.0 mg/cm^2. A copy of 2008 Langan and 2000 ET reports are provided in Appendices C & D, respectively.

3.3 Observations and Findings

The field survey of the subject Armory was conducted on October 23 & 25, 2019 by Langan's Miroslaw Baran, Adem Bajrami and Sanjay Patel, NYCDEP-certified asbestos investigators and NYSDOL-certified asbestos inspectors. Limited confirmatory samples of suspect materials were collected during the survey. As required by the USEPA, samples were analyzed by individual layer (i.e. floor tile and the associated mastic were analyzed as two (2) separate samples). Bulk samples of the suspect ACM were analyzed using the Polarized Light Microscopy (PLM) analytical methodology in accordance with 40CFR 763 and NESHAP regulations. Non-friable organically bound (NOB) material samples which tested negative via PLM were reanalyzed using transmission electron microscopy (TEM). Analytical testing was performed in accordance with NYSELAP Methods 198.1 (friable materials), 198.1(NOB), 198.4 (NOB-TEM) and 198.8 (surfacing materials containing vermiculite).

Refer to Table 1 for a summary of asbestos survey findings and Appendix A for the analytical test results and chain of custody documentation for the sampling performed during October 23 & 25, 2019 site visit. Sampling locations are depicted on Drawings ASL-1 thru ASL-7.

4.0 LEAD CONTAINING PAINT

Our review of the prior inspection report by ET indicate that the vast majority of the painted building components were identified to contain lead in excess of 1.0 mg/cm^2.

Limited testing of lead in painted surfaces was performed by Langan during our recent site visits. Overall, the painted surfaces were observed to be in poor condition. With the exception of ground level Drill Area, debris from damaged paint was observed mixed with ACM and other household debris throughout the building.

Refer to Table 2 for the testing conducted by Langan, and Attachment D for a copy of XRF screening data documented in ET report.

5.0 HAZARDOUS WASTE

The ET report documented and provided an inventory of Universal and other Waste identified in the building including but not limited to fluorescent lamps, high intensity discharge (HID) lamps, ballasts, mercury containing equipment, batteries, and miscellaneous chemicals. The lamp ballasts/capacitors were assumed to contain Polychlorinated Biphenyls (PCBs) and/or di (2) ethylhexyl phthalate (DEHP) based on the information observed on labels or markings. The inspection did not include sampling and analysis for waste classification, confirmation or identification purposes.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Asbestos Containing Materials

Regulatory Guidelines and Requirements:

Federal

In accordance with the Clean Air Act (CAA), the EPA established National Emission Standards for Hazardous Air Pollutants (NESHAP) to protect the public from exposure to airborne pollutants. Asbestos was one of the air pollutants, which was addressed under the NESHAP 40 CFR Part 61. The purpose of asbestos NESHAP regulations is to protect public health by minimizing the release of asbestos when facilities which contain ACM are being renovated or demolished. EPA is responsible for enforcing regulations related to asbestos during renovations and demolition; however, the CAA allows the EPA to delegate this authority to state and local Agencies. Even after the EPA delegates responsibility to a state or local agency, the EPA retains the authority to oversee agency performance and to enforce NESHAP regulations as appropriate.

State

Asbestos in New York State is regulated under the Labor Law Section 906, Part 56 of Title 12 of the Official Compilation of Codes, Rules, and Regulations. Within the department and for the purpose of the Department of Labor, this part (rule) is known as Industrial Code Rule No. 56 (ICR 56) relating to hazards to public safety and health during the removal, encapsulation, or disturbance of friable asbestos, or any handling of ACM that may result in the release of asbestos fiber.

City Regulations

Asbestos Control Program (ACP), Title 15, Chapter 1 of the New York City Department of Environmental Protection (NYCDEP) regulates all asbestos abatement activities occurring within the City of New York. The ACP regulations also require asbestos surveys and abatement work to be performed by a NYCDEP certified asbestos investigator and asbestos workers, respectively.

The New York City Department of Building (NYCDOB) requires an ACP notification to be included with the renovation/demolition permit applications. The notification is performed using ACP 5 or ACP 20/21 forms.

Asbestos containing materials were identified at the Armory. With the exception of the ground level Drill Area, debris from damaged ACM mixed with other household debris and damaged paint was throughout the building. Access to the building should be restricted until the clean-up inside the Armory is completed.

All confirmed and presumed ACM in the building that is to be left in place should be managed in good condition under an Operations and Management (O & M) plan. The purpose and objective of the O & M Plan is to maintain the assumed, presumed or known asbestos containing materials in good condition, prevent future release of asbestos fibers, and minimize exposure of all building occupants to asbestos fibers.

All identified ACM that would be impacted by any planned renovation/demolition must be removed prior to commencing such activities. The removal and disposal of ACM must be performed by a NYSDOL licensed asbestos handling contractor in accordance with Federal, state, and local regulations. Proper notifications must be filed with the EPA, NYSDOL, NYC-DEP and other regulatory agencies prior to performing such activities.

As required by NYSDOL and NYCDEP regulations, the abatement project must be monitored by a NYSDOL certified project monitor. The project monitor oversees the contractor's work practices and also performs pre, during, and final clearance post-abatement air sampling in accordance with state and city regulations.

6.2 Lead Containing Paint

The vast majority of the painted building components were identified to contain lead in excess of 1.0 mg/cm^2. The paint was flaking, cracking and in deteriorated conditions. With the exception of the ground level Drill Area, debris from damaged paint was observed mixed with ACM and other household debris throughout the building.

Debris clean-up and stabilization of painted surfaces will be necessary prior to building occupancy. The Occupational Safety and Health Administration (OSHA) considers any concentration of lead in paint to be lead containing paint. Regardless of the lead concentrations in painted surfaces, the contractor shall comply with 29 CFR 1926.62, OSHA regulations, and take precautionary measures for dust control and limit employee exposure to lead dust during construction.

Painted surfaces that would be impacted by planned activities such as drilling, cutting, scrapping, etc. and create dust should be properly addressed by following safe work practices, good housekeeping procedures and/or following proper abatement procedures. Grinding and sanding of paint without HEPA filter exhaust, open flame gas-fired torches, unconfined abrasive blasting, and chemical strippers containing methylene chloride or other human carcinogenic chemicals are not recommended.

In addition to dust control work practices, personal protective equipment (PPE) per task type is required. Depending on presumed exposure, this requires at least prescribed respirator equipment (i.e., P-100 to full face mask), protective clothing in addition to necessary (Standard of Care) protective task gloves and traditional construction safety gear including protective eyewear/boots/hard hat/safety vest.

The Federal Resource Conservation and Recovery Act (RCRA) regulation governs the handling, transportation, and disposal of hazardous materials. As part of the demolition work scope it must be determined whether the demolition debris that is generated exhibits one or more of the characteristic wastes listed in subpart C of 40 CFR Part 261. Lead in paint is a characteristic waste, and therefore, the demolition debris must be characterized prior to its disposal and, if found to be hazardous waste as defined by Federal Statutes, it will need to be properly handled and disposed.

Workers protection in accordance with 29 CFR 1926.62 shall be followed while performing torch cutting and welding operations on painted metal objects.

6.3 Hazardous Waste

Miscellaneous and universal waste consisting of but not limited to fluorescent light ballasts, fluorescent light bulbs, HID bulbs, HVAC units, etc. were identified at the Armory. Hazardous waste articles which would require removal shall be properly managed; recycled and/or disposed of at a landfill permitted to accept such waste. The removal, handling, recycling, and disposal shall be performed in accordance with applicable federal, state, and local regulations.

7.0 LIMITATIONS, EXCEPTIONS AND ASSUMPTIONS

Opinions and recommendations presented in this report apply to site conditions and features as they existed at the time of Langan's site visit, and those reasonably foreseeable. They cannot necessarily apply to conditions and features of which Langan is unaware and has not had the opportunity to evaluate.

Langan's evaluation of ACM was conducted in accordance with the standard of care and current customary practice of the profession. There are limitations inherent to visual surveys, and therefore, this asbestos survey does not claim to have sampled all possible suspect ACM present in the building.

Demolition/renovation activities may reveal concealed materials that were not accessible during the asbestos survey. Any suspect building material that is not listed in this report must be assumed to be ACM and treated as such unless otherwise confirmed by laboratory testing. If any concealed suspect ACM is uncovered during the planned demolition activities, then those activities that will impact suspect ACM must be discontinued until the suspect materials is sampled by an asbestos consultant and tested by an accredited laboratory for the presence of asbestos.

TABLES

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
ACM IDENTIFIED						
Sub-Basement						
SB4	Ebony/Transite with electrical box	---	ACM See Note 1.	6 SF	Fair	---
SB5	Ebony/Transite with electrical box	---	ACM See Note 1.	80 SF	Fair	---
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	500 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	1,000 LF	Unknown	See Note 7
Basement Level						
B01	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	400 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	1,500 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	4.00 CY	N/A	See Note 4.
	Ebony/Transite with electrical box	---	ACM See Note 1.	2 SF	Fair	---
	Pipe insulation debris	---	ACM See Note 1.	2,000 SF	N/A	---
B02	Ebony/Transite with electrical box	---	ACM See Note 1.	1 SF	Fair	---
B11	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	280 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	2.00 CY	N/A	See Note 4.
B14	Ebony/Transite with electrical box	---	ACM See Note 1.	1 SF	Fair	---
B15	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	10 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
B16	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	13 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	130 SF	N/A	See Note 3.
B17	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	14 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	140 SF	N/A	See Note 3.
B18	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	15 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	150 SF	N/A	See Note 3.
B19	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	200 SF	N/A	See Note 3.
B20A	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	150 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	4.00 CY	N/A	See Note 4.
B21	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	25 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	250 SF	N/A	See Note 3.
B22	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	21 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	210 SF	N/A	See Note 3.
B23	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	17 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	160 SF	N/A	See Note 3.
B24	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	21 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	210 SF	N/A	See Note 3.
B25	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	18 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	170 SF	N/A	See Note 3.
B26	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	180 LF	Poor	---

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
B27	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	55 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	50 SF	N/A	See Note 3.
B28	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	105 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	900 SF	N/A	See Note 3.
B29	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	130 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	900 SF	N/A	See Note 3.
B30	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	175 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	900 SF	N/A	See Note 3.
B31	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	140 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	900 SF	N/A	See Note 3.
B32	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	100 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	860 SF	N/A	See Note 3.
B33	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	80 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	400 SF	N/A	See Note 3.
B34	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	150 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	860 SF	N/A	See Note 3.
B35	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	150 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	860 SF	N/A	See Note 3.
B36	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	100 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	860 SF	N/A	See Note 3.
B37	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	360 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	900 SF	N/A	See Note 3.
B38	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	45 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	50 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	—	ACM See Note 1.	2.00 CY	N/A	See Note 4.
	Ebony/Transite with electrical box	—	ACM See Note 1.	4 SF	Fair	—
B39	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	15 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B40	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	—	ACM See Note 1.	1.00 CY	N/A	See Note 4.
B40A	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	90 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	—	ACM See Note 1.	2.00 CY	N/A	See Note 4.
B41	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	20 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	200 SF	N/A	See Note 3.
B42	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	12 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	120 SF	N/A	See Note 3.
B44	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	17 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	170 SF	N/A	See Note 3.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
B45	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	180 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	550 SF	N/A	See Note 3.
B46	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	20 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	190 SF	N/A	See Note 3.
B47	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	17 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	170 SF	N/A	See Note 3.
B48	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	15 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B50	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	20 LF	Poor	—
B51	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	14 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	130 SF	N/A	See Note 3.
B53	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	25 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	240 SF	N/A	See Note 3.
B54	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	700 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	5,800 SF	N/A	See Note 3.
B55	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	60 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	170 SF	N/A	See Note 3.
B56	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	50 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	500 SF	N/A	See Note 3.
B57	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	45 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	690 SF	N/A	See Note 3.
B61	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	55 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	250 SF	N/A	See Note 3.
B62	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	3 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	30 SF	N/A	See Note 3.
	VAT & mastic	—	ACM See Note 1.	200 SF	Poor	—
B63	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	10 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	20 SF	N/A	See Note 3.
B64	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	6 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	40 SF	N/A	See Note 3.
B65	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	15 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	100 SF	N/A	See Note 3.
B66	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	50 SF	N/A	See Note 3.
B67	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	15 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	3,000 SF	N/A	See Note 3.
B68	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	120 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	—	ACM See Note 1.	3.00 CY	N/A	See Note 4.
B71	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	70 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	1,600 SF	N/A	See Note 3.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
B72	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	25 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B73	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	20 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
B74	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	20 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
B75	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	20 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
B76	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	35 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
B77	Ebony/Transite with electrical box	—	ACM See Note 1.	1 SF	Fair	—
B78A	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	5 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	180 SF	N/A	See Note 3.
B78	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	60 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	340 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	—	ACM See Note 1.	2.00 CY	N/A	See Note 4.
B78B	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	100 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	370 SF	N/A	See Note 3.
	Door caulk	—	ACM See Note 1.	60 LF	Fair	—
B79	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	230 SF	N/A	See Note 3.
B80	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	160 SF	N/A	See Note 3.
B81	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B82	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	50 SF	N/A	See Note 3.
B83	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B84	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	100 SF	N/A	See Note 3.
B85	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	15 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B86	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	15 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B87	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	15 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	150 SF	N/A	See Note 3.
B88	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	50 SF	N/A	See Note 3.
B89	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	50 SF	N/A	See Note 3.
B93	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	30 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	180 SF	N/A	See Note 3.
B94	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	8 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	100 SF	N/A	See Note 3.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
B95	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	150 SF	N/A	See Note 3.
B96	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	180 SF	N/A	See Note 3.
B97	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	260 SF	N/A	See Note 3.
B99	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	8 LF	Poor	---
B100	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	80 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	480 SF	N/A	See Note 3.
B101	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	550 SF	N/A	See Note 3.
B102	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	30 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
B103	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	550 SF	N/A	See Note 3.
B104	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	400 SF	N/A	See Note 3.
B105	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	125 SF	N/A	See Note 3.
B106	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	125 SF	N/A	See Note 3.
B109	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	550 SF	N/A	See Note 3.
B110	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	60 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	480 SF	N/A	See Note 3.
B111	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	220 SF	N/A	See Note 3.
B112	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	220 SF	N/A	See Note 3.
B113	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	50 SF	N/A	See Note 3.
B114	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	10 SF	N/A	See Note 3.
B115	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	20 SF	N/A	See Note 3.
B116	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	50 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	125 SF	N/A	See Note 3.
B118	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	40 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.50 CY	N/A	See Note 4.
B119	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	660 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	3.00 CY	N/A	See Note 4.
B121	Ebony/Transite with electrical box	---	ACM See Note 1.	1 SF	Fair	---
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	500 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	15,000 LF	Unknown	See Note 7

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
Basement Mezzanine Level						
BM2	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	2 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	50 SF	N/A	See Note 3.
BM5	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
BM6	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	8 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	50 SF	N/A	See Note 3.
BM7	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	10 SF	N/A	See Note 3.
BM8	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	20 SF	N/A	See Note 3.
BM10	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	150 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	700 SF	N/A	See Note 3.
BM11	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	80 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	600 SF	N/A	See Note 3.
BM12	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	25 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
BM16	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	40 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	750 SF	N/A	See Note 3.
BM19	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	40 SF	N/A	See Note 3.
BM20	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	130 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	750 SF	N/A	See Note 3.
BM21	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	650 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	4.00 CY	N/A	See Note 4.
BM22	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	30 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	50 SF	N/A	See Note 3.
BM23	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	10 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	5 SF	N/A	See Note 3.
BM24	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	80 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	40 SF	N/A	See Note 3.
BM25	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	600 SF	N/A	See Note 3.
BM27	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.25 CY	N/A	See Note 4.
BM28	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	30 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	300 SF	N/A	See Note 3.
BM29	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	10 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
BM33	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	750 SF	N/A	See Note 3.
BM34	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.25 CY	N/A	See Note 4.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
BM36	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.25 CY	N/A	See Note 4.
BM37	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	460 SF	N/A	See Note 3.
BM38	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	40 SF	N/A	See Note 3.
BM39	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	200 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	1,100 SF	N/A	See Note 3.
BM43	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	1.00 CY	N/A	See Note 4.
BM45	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	50 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	290 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	1.00 CY	N/A	See Note 4.
BM48	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	380 SF	N/A	See Note 3.
BM49	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	10 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	15 SF	N/A	See Note 3.
BM50	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	25 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	25 SF	N/A	See Note 3.
BM51	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	320 SF	N/A	See Note 3.
BM52	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	25 SF	N/A	See Note 3.
BM53	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	45 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	360 SF	N/A	See Note 3.
BM54	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	30 SF	N/A	See Note 3.
BM56	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	260 SF	N/A	See Note 3.
BM58	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	300 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.50 CY	N/A	See Note 4.
BM59	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	25 LF	Poor	---
BM60	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	8 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	380 SF	N/A	See Note 3.
BM61	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	360 SF	N/A	See Note 3.
BM62	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	260 SF	N/A	See Note 3.
BM63	VAT & mastic	---	ACM See Note 1.	160 SF	Poor	---
BM64	Ebony/Transite with electrical box	---	ACM See Note 1.	1 SF	Fair	---
BM65	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	60 LF	Poor	---
BM65A	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	25 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.25 CY	N/A	See Note 4.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
BM66	VAT & mastic	—	ACM See Note 1.	1,450 SF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	1,450 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	—	ACM See Note 1.	0.75 CY	N/A	See Note 4.
BM67	VAT & mastic	—	ACM See Note 1.	160 SF	Poor	—
BM68	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	340 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	—	ACM See Note 1.	1.00 CY	N/A	See Note 4.
BM69	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	25 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	30 SF	N/A	See Note 3.
BM70	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	280 SF	N/A	See Note 3.
BM71	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	25 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	380 SF	N/A	See Note 3.
BM72	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	380 SF	N/A	See Note 3.
BM73	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	25 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	30 SF	N/A	See Note 3.
BM74	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	23 LF	Poor	—
BM75	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
BM76	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	23 LF	Poor	—
BM77	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	380 SF	N/A	See Note 3.
BM78	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	25 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	30 SF	N/A	See Note 3.
BM79	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	23 LF	Poor	—
BM80	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
BM81	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	23 LF	Poor	—
BM82	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	380 SF	N/A	See Note 3.
BM83	Block/air-cell pipe & joint insulation	—	ACM See Note 1.	12 LF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	15 SF	N/A	See Note 3.
BM85	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.
BM87	VAT & mastic	—	ACM See Note 1.	330 SF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	330 SF	N/A	See Note 3.
BM88	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	60 SF	N/A	See Note 3.
BM89	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	50 SF	N/A	See Note 3.
BM90	VAT & mastic	—	ACM See Note 1.	200 SF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	200 SF	N/A	See Note 3.
BM91	VAT & mastic	—	ACM See Note 1.	100 SF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	100 SF	N/A	See Note 3.
BM92	VAT & mastic	—	ACM See Note 1.	300 SF	Poor	—
	Loose ACM contaminated construction & household debris	—	ACM See Note 1.	300 SF	N/A	See Note 3.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
BM93	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	50 SF	N/A	See Note 3.
BM94	VAT & mastic	---	ACM See Note 1.	200 SF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	200 SF	N/A	See Note 3.
BM95	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	60 SF	N/A	See Note 3.
BM96	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	60 SF	N/A	See Note 3.
BM97	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	500 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	4.00 CY	N/A	See Note 4.
BM98	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	30 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	15 SF	N/A	See Note 3.
BM99	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	50 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	10 SF	N/A	See Note 3.
BM101	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	10 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.50 CY	N/A	See Note 4.
BM102	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	20 SF	N/A	See Note 3.
BM103	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	20 SF	N/A	See Note 3.
BM104	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	20 SF	N/A	See Note 3.
BM105	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.25 CY	N/A	See Note 4.
BM106	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	5 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.15 CY	N/A	See Note 4.
BM107	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	5 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.15 CY	N/A	See Note 4.
BM111	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	15 SF	N/A	See Note 3.
BM123	VAT & mastic	---	ACM See Note 1.	1,500 SF	Fair	See Note 5.
BM134	VAT & mastic	---	ACM See Note 1.	1,900 SF	Fair	See Note 5.
BM136	VAT & mastic	---	ACM See Note 1.	440 SF	Fair	See Note 5.
BM137	VAT & mastic	---	ACM See Note 1.	360 SF	Fair	See Note 5.
BM139	VAT & mastic	---	ACM See Note 1.	200 SF	Fair	See Note 5.
BM140	VAT & mastic	---	ACM See Note 1.	130 SF	Fair	See Note 5.
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	1,000 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	10,000 LF	Unknown	See Note 7
Ground Level						
G1	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	750 SF	N/A	See Note 3.
G2	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	390 SF	N/A	See Note 3.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
G2	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	1.00 CY	N/A	See Note 4.
G3	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	25 SF	N/A	See Note 3.
G4	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	200 SF	N/A	See Note 3.
G5	Loose ACM contaminated construction & household debris	---	Assumed ACM --	100 SF	N/A	Inaccessible Space
G6	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	45 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.15 CY	N/A	See Note 4.
G8	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	130 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	2.00 CY	N/A	See Note 4.
G9	VAT & mastic	---	ACM See Note 1.	880 SF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	880 SF	N/A	See Note 3.
G10	VAT & mastic	---	ACM See Note 1.	120 SF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	120 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.50 CY	N/A	See Note 4.
G11	VAT & mastic	---	ACM See Note 1.	930 SF	Poor	---
G12	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	930 SF	Poor	---
G13	VAT & mastic	---	ACM See Note 1.	120 SF	Poor	---
G14	VAT & mastic	---	ACM See Note 1.	930 SF	N/A	See Note 6.
G15	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	550 SF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
G16	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	550 SF	Poor	---
	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	20 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
G19	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	870 SF	Poor	---
G20	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	890 SF	Poor	---
G22	VAT & mastic	---	ACM See Note 1.	870 SF	Poor	---
G23	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	870 SF	Poor	---
G24	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	780 SF	Poor	---
G25	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	150 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.50 CY	N/A	See Note 4.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
G28/29	Pipe insulation debris in chases	PID	ACM CHRY 1.5%	100 SF	N/A	---
G30	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	840 SF	N/A	See Note 3.
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	50.00 CY	N/A	See Note 4.
G41	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	35 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	N/A	See Note 3.
G42	Ebony/Transite with electrical box	---	ACM See Note 1.	50 SF	Fair	---
G43	Ebony/Transite with electrical box	---	ACM See Note 1.	50 SF	Fair	---
G44	Loose ACM contaminated construction & household debris	---	Assumed ACM --	20 CY	N/A	Inaccessible Space
G45	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	90 LF	Fair	---
	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	3.00 CY	N/A	See Note 4.
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	2,500 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	15,000 LF	Unknown	See Note 7
Ground Level Mezzanine						
GM1	Wall panel glue	---	ACM See Note 1.	100 SF	Poor	---
GM2	Pipe insulation debris	---	ACM See Note 1.	50 SF	N/A	---
GM5	VAT & mastic	---	ACM See Note 1.	130 SF	Fair	---
GM8	VAT & mastic	---	ACM See Note 1.	130 SF	Fair	---
GM11	VAT & mastic	---	ACM See Note 1.	130 SF	Fair	---
GM13	Pipe insulation debris	---	ACM See Note 1.	5 SF	N/A	---
	VAT & mastic	---	ACM See Note 1.	420 SF	Poor	---
GM15	Pipe insulation debris	---	ACM See Note 1.	15 SF	N/A	---
	VAT & mastic	---	ACM See Note 1.	420 SF	Poor	---
GM16	VAT & mastic	---	ACM See Note 1.	130 SF	Poor	---
GM18	VAT & mastic	---	ACM See Note 1.	130 SF	Poor	---
GM19	Pipe insulation debris	---	ACM See Note 1.	50 SF	N/A	---
GM21	Wall panel glue	---	ACM See Note 1.	50 SF	Poor	---
	VAT & mastic	---	ACM See Note 1.	130 SF	Fair	---
GM22	VAT & mastic	---	ACM See Note 1.	130 SF	Poor	---
GM25	VAT & mastic	---	ACM See Note 1.	130 SF	Poor	---
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	600 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	1,000 LF	Unknown	See Note 7
Second Floor						
202	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	50 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	360 SF	N/A	See Note 3.
202A	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	360 SF	N/A	See Note 3.
204	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	40 LF	Poor	---
	VAT & mastic	---	ACM See Note 1.	650 SF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	650 SF	N/A	See Note 3.
207	VAT & mastic	---	ACM See Note 1.	2,200 SF	Poor	---
	Mirror glue	---	ACM See Note 1.	20 SF	Poor	---
	Wall panel glue	---	ACM See Note 1.	1,600 SF	Poor	---
209	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	125 SF	N/A	See Note 3.
	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	6 LF	Poor	---

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
210	Bags with ACM contaminated construction & household debris	---	ACM See Note 1.	0.10 CY	N/A	See Note 4.
211	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	510 SF	Poor	See Note 3.
212	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	510 SF	Poor	See Note 3.
213	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	500 SF	N/A	See Note 3.
214	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	25 SF	N/A	See Note 3.
215	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	530 SF	Poor	See Note 3.
216	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	600 SF	Poor	See Note 3.
217	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	9 LF	Poor	---
218	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	390 SF	Poor	See Note 3.
219	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	400 SF	Poor	See Note 3.
220	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	9 LF	Poor	---
222	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	390 SF	Poor	See Note 3.
223	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	390 SF	Poor	See Note 3.
225	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	9 LF	Poor	---
226	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	390 SF	Poor	See Note 3.
227/ 228	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	510 SF	Poor	See Note 3.
232	Ebony/Transite with electrical box	---	ACM See Note 1.	10 SF	Fair	---
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	1,500 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	3,000 LF	Unknown	See Note 7
Third Floor						
302	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	Poor	See Note 3.
305	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	600 SF	Poor	See Note 3.
307	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	450 SF	Poor	See Note 3.
310	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	140 LF	Poor	---
	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	1,400 SF	Poor	See Note 3.

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
311	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	25 SF	Poor	See Note 3.
313	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	450 SF	Poor	See Note 3.
315	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	480 SF	Poor	See Note 3.
316	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	200 SF	Poor	See Note 3.
318	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	100 SF	Poor	See Note 3.
319	Pipe insulation debris	---	ACM See Note 1.	60 SF	N/A	---
318	VAT & mastic (damaged) & ACM contaminated construction & household debris	---	ACM See Note 1.	150 SF	Poor	See Note 3.
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	400 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	1,000 LF	Unknown	See Note 7
Forth Floor						
401	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	25 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	400 SF	N/A	See Note 3.
402	Block/air-cell pipe & joint insulation	---	ACM See Note 1.	25 LF	Poor	---
	Loose ACM contaminated construction & household debris	---	ACM See Note 1.	400 SF	N/A	See Note 3.
Entire Level	Concealed block and air-cell pipe insulation	---	ACM See Note 1.	100 LF	Unknown	See Note 8
Entire Level	Electrical wire insulation	---	ACM See Note 1.	200 LF	Unknown	See Note 7
Fifth Floor						
Entire Level	Electrical wire insulation	---	ACM See Note 1.	50 LF	Unknown	See Note 7
Exterior (Gable Ends, Clerestory Bands and Parapets)						
--	Mastic, flashing materials and caulking on gable ends and clerestory bands	---	ACM See Note 1.	12,000 SF	Unknown	See Note 9.
NON-ACM IDENTIFIED						
Sub-Basement						
Entire Level	Wall plaster	WP	Non-ACM See Note 10.	-- --	Poor	Throughout
SB7	Boiler Lining (small square boilers)	BLN	Non-ACM ND	-- --	Poor	---
Entire Level	New mud-pack pipe joint insulation associated w/ fiberglass	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
SB7	Boiler gasket	---	Non-ACM See Note 2.	-- --	Poor	---
SB7	Boiler edge patch material	---	Non-ACM See Note 2.	-- --	Poor	---
SB7 SB10	Breeching insulation	---	Non-ACM See Note 2.	-- --	Poor	---
Basement Level						
Entire Level	Wall plaster and ceiling plaster	WP CP	Non-ACM See Note 10.	-- --	Poor	Throughout

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
Entire Level	Electric arc protecting shield with new electrical panels	EAP	Non-ACM ND	-- --	Fair	Select Locations
Entire Level	New mud-pack pipe joint insulation associated w/ fiberglass	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Sheetrock wallboard and joint compound	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Vibration dumper cloth	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Entire Level	Pressboard material	---	Non-ACM See Note 2.	-- --	Poor	Select Locations
Entire Level	Electric panel board with new panels	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Entire Level	Cove base and associated mastic	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Entire Level	Pyroblock	---	Non-ACM See Note 2.	-- --	Unknown	Scattered Locations
Basement Mezzanine Level						
Entire Level	Wall plaster and ceiling plaster	WP CP	Non-ACM See Note 10.	-- --	Poor	Throughout
Entire Level	Electric arc protecting shield with new electrical panels	EAP	Non-ACM ND	-- --	Fair	Select Locations
Entire Level	New mud-pack pipe joint insulation associated w/ fiberglass	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Sheetrock wallboard and joint compound	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Vibration dumper cloth	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Entire Level	Pressboard material	---	Non-ACM See Note 2.	-- --	Poor	Select Locations
Entire Level	Electric panel board with new panels	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Entire Level	Cove base and associated mastic	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Entire Level	Pyroblock	---	Non-ACM See Note 2.	-- --	Unknown	Scattered Locations
Ground Level						
G1/G2	Pipe joint insulation in chases	PJ1	Non-ACM ND	-- --	Poor	---
G4	12-inch ceiling tile	CT	Non-ACM ND	-- --	Poor	---
	Glue to ceiling tile	CGD	Non-ACM ND	-- --	Poor	---
G4 G5	Window glazing putty	WGP	Non-ACM ND	-- --	Fair	---
G18	Red cementitious floor material	CFM	Non-ACM ND	-- --	Good	---
G31 thru 39	Pipe joint insulation	PJ2	Non-ACM ND	-- --	Poor	---
Entire Level	Wall plaster and ceiling plaster	WP CP	Non-ACM See Note 10.	-- --	Poor	Throughout
Entire Level	Electric arc protecting shield with new electrical panels	EAP	Non-ACM ND	-- --	Fair	Select Locations
Entire Level	New mud-pack pipe joint insulation associated w/ fiberglass	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Sheetrock wallboard and joint compound	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Vibration dumper cloth	---	Non-ACM See Note 2.	-- --	Fair	Select Locations

	Table 1 - SUMMARY OF ASBESTOS SURVEY FINDINGS - ACM IDNETIFIED					
Space ID	Material	Sample ID	Survey Results	Estimated Quantity of ACM	Condition	Notes/Comments
Entire Level	Electric panel board with new panels	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Entire Level	Cove base and associated mastic	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Ground Mezzanine Level						
Entire Level	Wall plaster and ceiling plaster	WP CP	Non-ACM See Note 10.	-- --	Poor	Throughout
Entire Level	Sheetrock wallboard and joint compound	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Cove base and associated mastic	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Second Floor						
213	Red cementitious floor material	CFM	Non-ACM ND	-- --	Good	---
Entire Level	Wall plaster and ceiling plaster	WP CP	Non-ACM See Note 10.	-- --	Poor	Throughout
Entire Level	Sheetrock wallboard and joint compound	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Cove base and associated mastic	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Third Floor						
Entire Level	Wall plaster and ceiling plaster	WP CP	Non-ACM See Note 10.	-- --	Poor	Throughout
Entire Level	Sheetrock wallboard and joint compound	---	Non-ACM See Note 2.	-- --	Poor	Scattered Locations
Entire Level	Cove base and associated mastic	---	Non-ACM See Note 2.	-- --	Fair	Select Locations
Fourth Floor						
Entire Level	Black coating on brick wall under plaster	WCM	Non-ACM ND	-- --	Poor	---
Entire Level	Wall plaster and ceiling plaster	WP CP	Non-ACM See Note 10.	-- --	Poor	Throughout

NOTES:

1 ACM as per Langan Asbestos Investigation Report dated September 25, 2008.

2 Non-ACM as per Langan Asbestos Investigation Report dated September 25, 2008.

3 With the exception of the ground level Drill Area, debris from damaged ACM mixed with other household debris and damaged paint was throughout the Armory.

4 Black bags filled with asbestos contaminated construction & household debris were identified at several locations, all bags in the building shall be assumed ACM contaminated.

5 Multi-layers of floor tile/covering and mastic were observed at isolated locations. At the eastern section of the Basement Mezzanine, ACM floor tiles and mastic were observed covered with a layer of plywood and non-ACM floor tiles.

6 This area was renovated , however, old ACM floor tiles as identified in 2008 Langan Report may exist under new flooring.

7 Provided quantity reflects an approximate length of electrical conduits exposed and concealed within wall, floor and ceiling cavities throughout the floor. The size and number of wires within the conduits may vary.

8 An estimate is provided for the presence of concealed ACM pipe insulation within inaccessible wall, floor, and ceiling cavities.

9 The estimated quantity reflects area occupied by the panels. The information related to ACM within the gable areas is based on the data documented in prior survey reports. Due to height restrictions, the gable areas were inaccessible during Langan surveys.

10 Non-ACM as per Langan Asbestos Investigation Report dated September 25, 2008. Confirmatory sampling was performed during recent survey. Laboratory test results confirmed wall and ceiling plaster to be non-ACM.

Table 2 - XRF SCREENING RESULTS								
Survey ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments
				Floor	Area			
N/A	Calibration					1.00		---
N/A	Calibration					0.90		
N/A	Calibration					0.90		
1	**Wall**	**Plaster**	**White**	**2nd**	**Space 213**	**34.00**	**POSITIVE**	**Poor**
2	Truss/Column	Metal	Grey	2nd	Space 232	0.90	NEGATIVE	Fair to Good
3	**Truss/Column**	**Metal**	**Grey**	**2nd**	**Space 232**	**19.60**	**POSITIVE**	**Fair to Good**
4	**Truss/Column**	**Metal**	**Grey**	**2nd**	**Space 232**	**4.20**	**POSITIVE**	**Fair to Good**
5	**Handrail**	**Metal**	**Grey**	**2nd**	**Space 232**	**8.20**	**POSITIVE**	**Fair to Good**
6	Wall	Brick	Grey	2nd	Space 232	0.10	NEGATIVE	Poor
7	Wall	Brick	Grey	2nd	Space 232	-0.10	NEGATIVE	Poor
8	**Handrail**	**Metal**	**Grey**	**2nd**	**Space 232**	**5.70**	**POSITIVE**	**Fair to Good**
9	Wall	Brick	Grey	2nd	Space 232	0.00	NEGATIVE	Poor
10	Wall	Brick	Grey	2nd	Space 232	0.30	NEGATIVE	Poor
11	**Pipe insulation**	**Canvas**	**Green**	**2nd**	**Space 232**	**1.90**	**POSITIVE**	**Fair to Good**
12	**Truss/Column**	**Metal**	**Grey**	**2nd**	**Space 232**	**2.20**	**POSITIVE**	**Fair to Good**
13	Conduit	Metal	Lt.Green	2nd	Space 232	0.30	NEGATIVE	Good
14	**Beam**	**Metal**	**Beige**	**2nd**	**Space 232**	**8.70**	**POSITIVE**	**Poor**
15	**Stair**	**Metal**	**Grey**	**2nd**	**Space 232**	**8.10**	**POSITIVE**	**Poor**
16	**Radiator**	**Metal**	**Silver**	**2nd**	**Space 232**	**8.50**	**POSITIVE**	**Fair to Good**
17	**Wall**	**Plaster**	**Tan**	**2nd**	**Space 231**	**37.00**	**POSITIVE**	**Poor**
18	**Wall**	**Plaster**	**Grey**	**2nd**	**Space 231**	**39.00**	**POSITIVE**	**Poor**
19	**Ceiling**	**Plaster**	**Grey**	**2nd**	**Space 213**	**40.00**	**POSITIVE**	**Poor**
20	**Wall**	**Plaster**	**Tan**	**2nd**	**Space 206**	**15.60**	**POSITIVE**	**Poor**
21	**Wall**	**Plaster**	**Grey**	**2nd**	**Space 213**	**43.00**	**POSITIVE**	**Poor**
22	**Wall**	**Plaster**	**Grey**	**3rd**	**Space 313**	**40.00**	**POSITIVE**	**Poor**
23	**Frame (Door)**	**Wood**	**Grey**	**3rd**	**Space 313**	**38.00**	**POSITIVE**	**Poor**
24	**Door**	**Wood**	**Grey**	**3rd**	**Space 313**	**41.00**	**POSITIVE**	**Poor**
25	**Wall**	**Plaster**	**Beige**	**1st**	**Sapce G18**	**40.00**	**POSITIVE**	**Poor**
26	**Ceiling**	**Plaster**	**Beige**	**1st**	**Sapce G18**	**39.00**	**POSITIVE**	**Poor**
27	Door	Wood	Varnish	1st	Sapce G18	0.00	NEGATIVE	Fair to Good
28	Frame (Door)	Wood	Varnish	1st	Sapce G18	-0.30	NEGATIVE	Fair to Good
29	**Wall**	**Brick**	**Brown**	**1st**	**Sapce G45**	**13.50**	**POSITIVE**	**Fair to Good**
30	**Wall**	**Brick**	**Beige**	**1st**	**Sapce G45**	**6.60**	**POSITIVE**	**Poor**
31	**Wall**	**Brick**	**Brown**	**1st**	**Sapce G45**	**1.30**	**POSITIVE**	**Fair to Good**
32	Wall	Brick	Tan	1st	Sapce G45	0.00	NEGATIVE	Fair to Good
33	**Wall**	**Brick**	**Tan**	**1st**	**Sapce G45**	**4.60**	**POSITIVE**	**Fair to Good**
34	**Floor**	**Concrete**	**Yellow**	**1st**	**Sapce G45**	**12.80**	**POSITIVE**	**Fair to Good**
35	**Bollard**	**Metal**	**Yellow**	**1st**	**Sapce G45**	**5.10**	**POSITIVE**	**Good**
36	**Bollard**	**Metal**	**Yellow**	**1st**	**Sapce G45**	**2.80**	**POSITIVE**	**Good**
37	**Ceiling**	**Plaster**	**Beige**	**BMez**	**Sapce BM65**	**31.00**	**POSITIVE**	**Poor**
38	**Wall**	**Plaster**	**Grey**	**BMez**	**Sapce BM65**	**32.00**	**POSITIVE**	**Poor**
39	Door	Metal	Grey	BMez	Sapce BM65	0.80	NEGATIVE	Poor
40	**Frame (Door)**	**Metal**	**Grey**	**BMez**	**Sapce BM65**	**4.80**	**POSITIVE**	**Poor**
41	**Door**	**Wood**	**Green**	**BMez**	**Sapce BM64**	**2.00**	**POSITIVE**	**Poor**
42	**Frame (Door)**	**Wood**	**Green**	**BMez**	**Sapce BM64**	**1.70**	**POSITIVE**	**Poor**
43	**Column**	**Metal**	**Grey**	**BMez**	**Sapce BM114**	**25.40**	**POSITIVE**	**Poor**
44	**Column**	**Metal**	**White**	**BMez**	**Sapce BM114**	**25.80**	**POSITIVE**	**Poor**
45	**Wall**	**Brick**	**Grey**	**BMez**	**Sapce BM114**	**26.40**	**POSITIVE**	**Poor**
46	Wall	Brick	Tan	BMez	Sapce BM114	0.20	NEGATIVE	Poor
47	Wall	Brick	Tan	BMez	Sapce BM114	0.50	NEGATIVE	Poor
48	Ceiling	Plaster	Beige	BMez	Sapce BM114	-0.20	NEGATIVE	Poor
49	**Wall**	**Brick**	**Green**	**BMez**	**Sapce BM36**	**1.80**	**POSITIVE**	**Poor**
50	Column	Concrete	Tan	BMez	Sapce BM23	0.30	NEGATIVE	Poor
51	**Column**	**Concrete**	**Tan**	**BMez**	**Sapce BM23**	**42.00**	**POSITIVE**	**Poor**
52	**Wall**	**Brick**	**Tan**	**BMez**	**Sapce BM22**	**33.00**	**POSITIVE**	**Poor**
53	Wall	Brick	Grey	BMez	Sapce BM16	0.30	NEGATIVE	Poor
54	**Door**	**Metal**	**Green**	**BMez**	**Sapce BM10**	**19.00**	**POSITIVE**	**Poor**
55	**Column**	**Metal**	**Tan**	**BMez**	**Sapce BM10**	**27.20**	**POSITIVE**	**Poor**
56	Wall	Brick	Lt.Green	BMez	Sapce BM4	0.20	NEGATIVE	Poor
57	**Column**	**Concrete**	**Grey**	**BMez**	**Sapce BM1**	**2.20**	**POSITIVE**	**Poor**
58	**Column**	**Metal**	**Orange**	**Bsmt**	**Sapce B67**	**23.40**	**POSITIVE**	**Poor**
59	**Column**	**Metal**	**Yellow**	**Bsmt**	**Sapce B01**	**29.80**	**POSITIVE**	**Poor**
60	**Ramp**	**Wood**	**Yellow**	**Bsmt**	**Sapce B01**	**26.90**	**POSITIVE**	**Poor**
61	**Column**	**Metal**	**Yellow**	**Bsmt**	**Sapce B01**	**9.60**	**POSITIVE**	**Poor**
62	**Column**	**Metal**	**Orange**	**Bsmt**	**Sapce B01**	**18.90**	**POSITIVE**	**Poor**
63	**Beam**	**Metal**	**Orange**	**Bsmt**	**Sapce B01**	**10.80**	**POSITIVE**	**Poor**
64	**Door**	**Wood**	**Green**	**Bsmt**	**Sapce B01**	**16.80**	**POSITIVE**	**Poor**
65	**Frame (Door)**	**Wood**	**Green**	**Bsmt**	**Sapce B01**	**32.00**	**POSITIVE**	**Poor**
66	**Air Duct**	**Metal**	**Orange**	**Bsmt**	**Sapce B57**	**13.70**	**POSITIVE**	**Fair to Good**
67	**Air Duct**	**Metal**	**Orange**	**Bsmt**	**Sapce B01**	**5.00**	**POSITIVE**	**Fair to Good**

Table 2 - XRF SCREENING RESULTS								
Survey ID #	Component	Substrate	Color	Test Location		Total Lead mg/cm^2	Results	Comments
				Floor	Area			
68	**Wall**	**Plaster**	**Tan**	**Bsmt**	**Sapce B43**	**2.60**	**POSITIVE**	**Poor**
69	**Wall**	**Plaster**	**Tan**	**Bsmt**	**Sapce B43**	**21.20**	**POSITIVE**	**Poor**
70	**Ceiling**	**Plaster**	**Tan**	**Bsmt**	**Sapce B58**	**21.40**	**POSITIVE**	**Poor**
71	Wall	Brick	Red	Bsmt	Sapce B45	-0.10	NEGATIVE	Poor
72	Wall	Brick	Tan	Bsmt	Sapce B45	0.00	NEGATIVE	Poor
73	**Wall**	**Brick**	**Tan**	**Bsmt**	**Sapce B77**	**47.00**	**POSITIVE**	**Poor**
74	Column	Plaster	Tan	Bsmt	Sapce B77	-0.30	NEGATIVE	Poor
75	**Stair**	**Metal**	**Grey**	**Bsmt**	**Sapce B54**	**16.30**	**POSITIVE**	**Poor**
76	**Wall**	**Plaster**	**Blue**	**Bsmt**	**Sapce B79**	**30.00**	**POSITIVE**	**Poor**
77	**Wall**	**Brick**	**Grey**	**Bsmt**	**Sapce B38**	**12.30**	**POSITIVE**	**Poor**
78	**Column**	**Metal**	**Grey**	**Bsmt**	**Sapce B38**	**28.50**	**POSITIVE**	**Poor**
79	**Wall**	**Brick**	**Blue**	**Bsmt**	**Sapce B35**	**4.10**	**POSITIVE**	**Poor**
80	**Floor**	**Concrete**	**Grey**	**Bsmt**	**Sapce B35**	**1.50**	**POSITIVE**	**Poor**
81	**Wall**	**Concrete**	**Grey**	**Bsmt**	**Sapce B38**	**3.50**	**POSITIVE**	**Poor**
82	**Wall**	**Brick**	**White**	**Bsmt**	**Sapce B31**	**2.10**	**POSITIVE**	**Poor**
83	Wall	Brick	Green	Bsmt	Sapce B38	-0.10	NEGATIVE	Fair to Good
84	Wall	Brick	Red	Bsmt	Sapce B38	-0.20	NEGATIVE	Fair to Good
85	Wall	Brick	Silver	Bsmt	Sapce B38	-0.20	NEGATIVE	Fair to Good
86	**Wall**	**Brick**	**Grey**	**Bsmt**	**Sapce B38**	**1.70**	**POSITIVE**	**Poor**
87	Wall	Wood	Tan	Bsmt	Sapce B121	0.00	NEGATIVE	Fair to Good
88	Wall	Brick	White	Bsmt	Sapce B121	0.00	NEGATIVE	Fair to Good
89	Wall	Brick	Tan	Bsmt	Sapce B121	0.10	NEGATIVE	Fair to Good
N/A	Calibration					0.90		
N/A	Calibration					0.90		---
N/A	Calibration					1.10		

NEGATIVE	= Negative Lead Result
POSITIVE	= Positive Lead Result

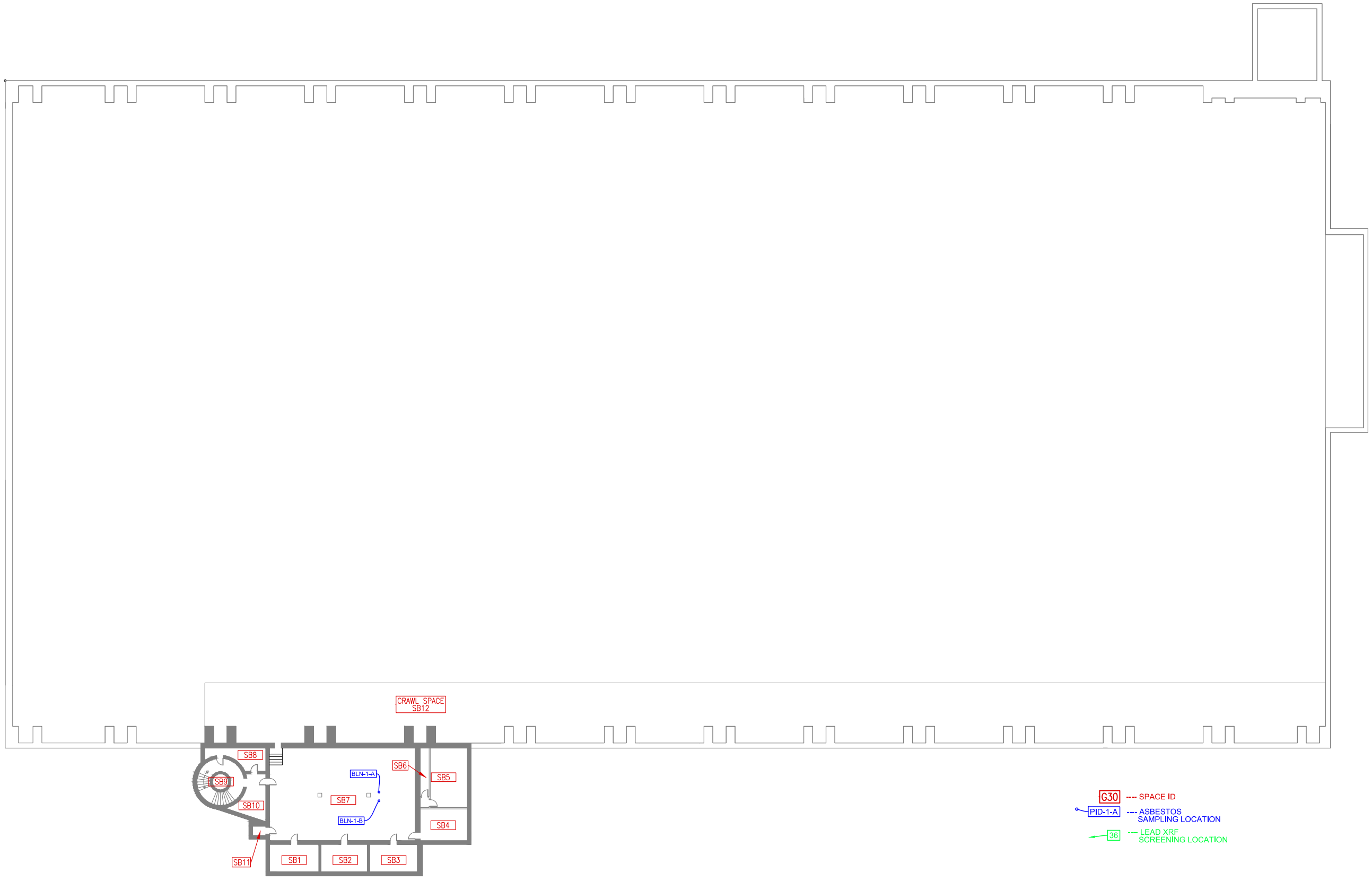
<LOD = Less than level of detection

Table 3 - UNIVERSAL/HAZARDOUS WASTE INVENTORY							
Article/Device	**Approximate Quantity [Units]**						
	Sub-Basement	**Basement**	**Basement Mezzanine**	**Ground Level**	**Ground Mezzanine**	**Second Floor**	**Third Floor**
UNIVERSAL WASTE GROUP							
Fluorescent lamps	50	1,000	1,400	250	50	350	2
Emergency lights with Batteries	--	7	30	10	--	--	--
Batteries	--	5	--	7	--	--	--
MCE Thermostats/Gauges	9	1	--	--	--	--	--
HID, MVC, HPS, MH lamps	--	6	--	13	--	--	--
Compact Fluorescent Lamp (CFL)	--	--	--	10	5	--	--
Mercury light ballasts	--	--	--	72	--	--	--
WASTE CONTAINING RADIOACTIVE MATERIALS* GROUP							
Smoke detectors	--	--	30	--	--	--	--
Exit signs	--	10	10	12	--	20	--
PCBs CONTAING WASTE* GROUP							
Fluorescent Light Ballasts	25	450	690	150	25	70	4
Electric motors with capacitors that may contain PCBs (associated with pumps, fans, shutter door openers, etc.)	12	11	--	7	--	--	--
Electronic equipment containing circuit boards with capacitors such as Computers and Peripherals, Telephones, TVs, etc.	--	--	--	30	10	--	--
Wall mounted electronic devices containing circuit boards with capacitors	--	20	20	--	--	--	--
WASTE CONTAINING CFCs and/or HCFCs* GROUP							
Refrigerator/Water Fountain	1	2	--	2	--	--	--
MIXED HAZARDOUS WASTE GROUP							
Fire extinguishers	1	5	10	--	--	1	2
Chemicals (Bottles/Cans)	--	--	--	--	5	--	10
Paint (5-Gallon Bucket) - Old unknown content	--	--	70	--	--	--	--

* - Due to live electricity and building's operations the ballasts associated with the light fixtures and other electrical devices are assumed to contain PCBs; EXIT signs and smoke detectors are assumed to contain radioactive materials; and heat transformer systems are assumed to contain CFCs and/or HCFCs.

MCE - Mercury-Containing Equipment; HID - High Intensity Discharge; MVC - Mercury Vapor Containing; HPS - High Pressure Sodium; MH - Metal Halide; CFCs - Chlorodifluoromethanes (R-12); HCFCs - Hydrofluorocarbons (R-22)

DRAWINGS



1 / ASL-1 SUB-BASEMENT
SCALE N.T.S

GENERAL NOTES:

A. THIS PLAN IS PROVIDED TO SHOW APPROXIMATE SAMPLING LOCATIONS. THE ACTUAL LAYOUT OF THE BUILDING AND BUILDING EQUIPMENT MAY BE SLIGHTLY DIFFERENT THAN SHOWN.

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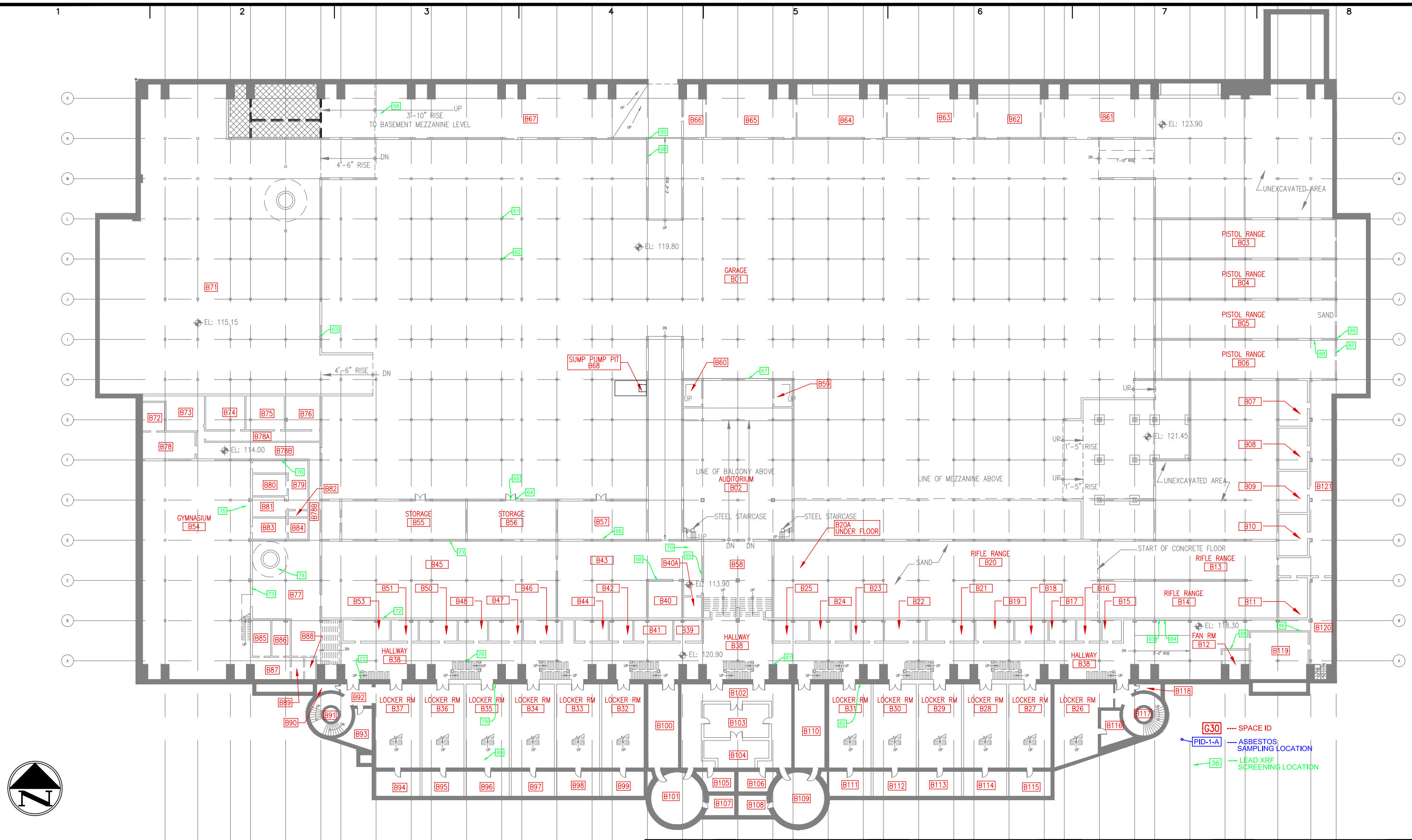
Project
Kingsbridge Armory
1 West Kingsbridge Rd
BRONX NEW YORK

Drawing Title
SPACE IDs
ASBESTOS SAMPLING
AND LEAD XRF
SCREENING LOCATIONS

Project No. 170321307
Date 2019-11-4
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1 / ASL-2 BASEMENT

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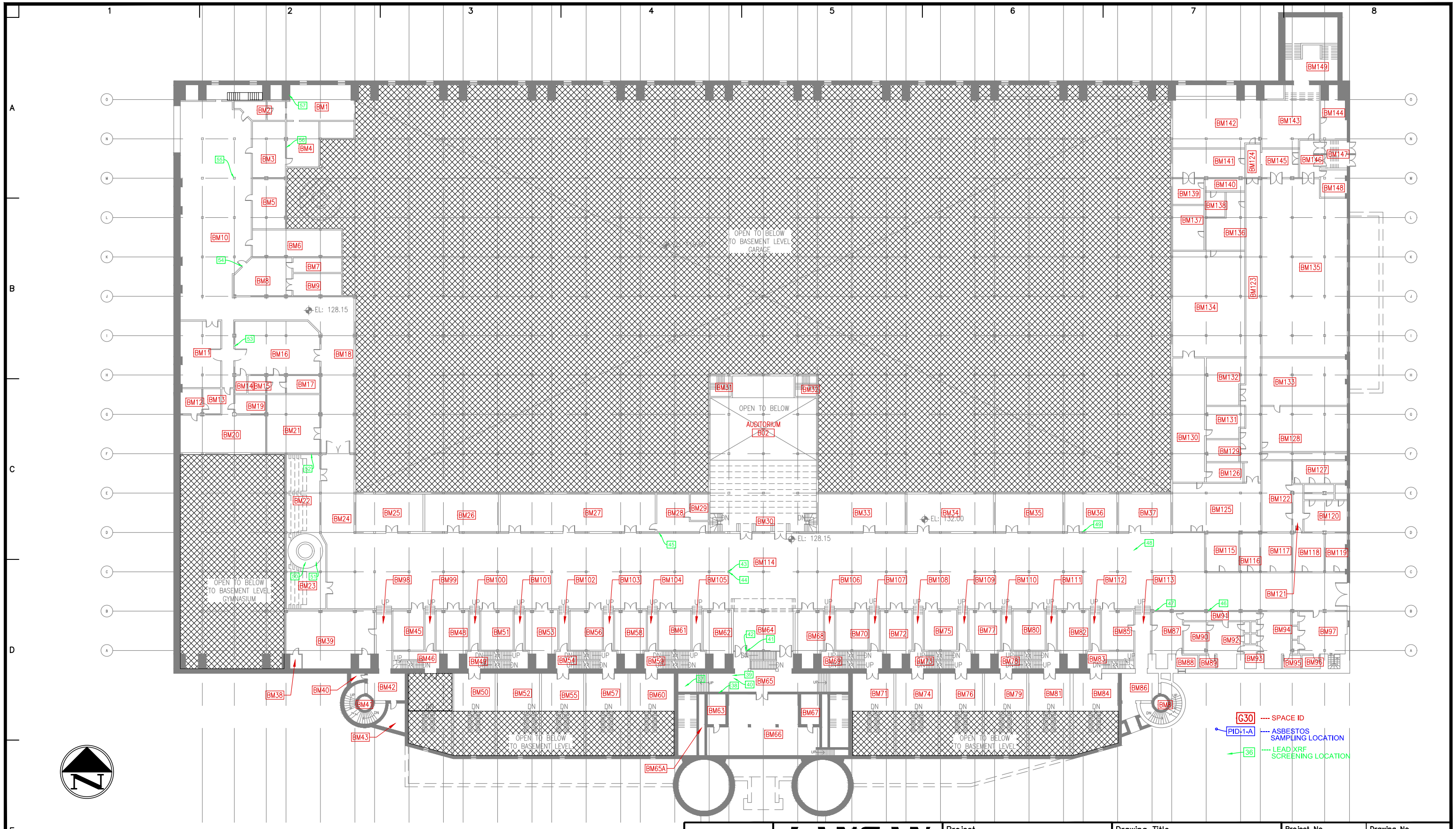
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1 ASL-3

BASEMENT MEZZANINE

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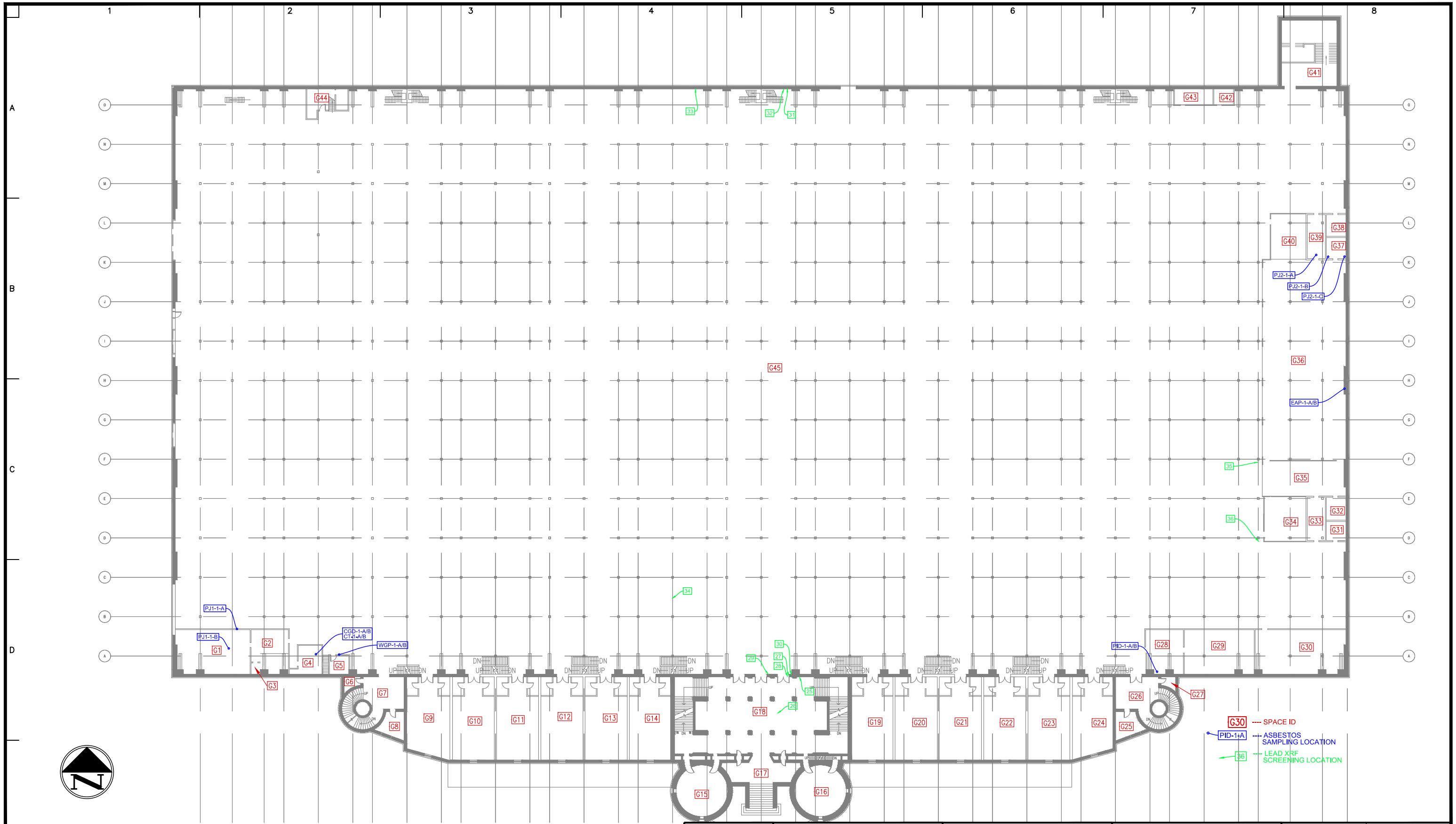
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1 / ASL-4 GROUND LEVEL

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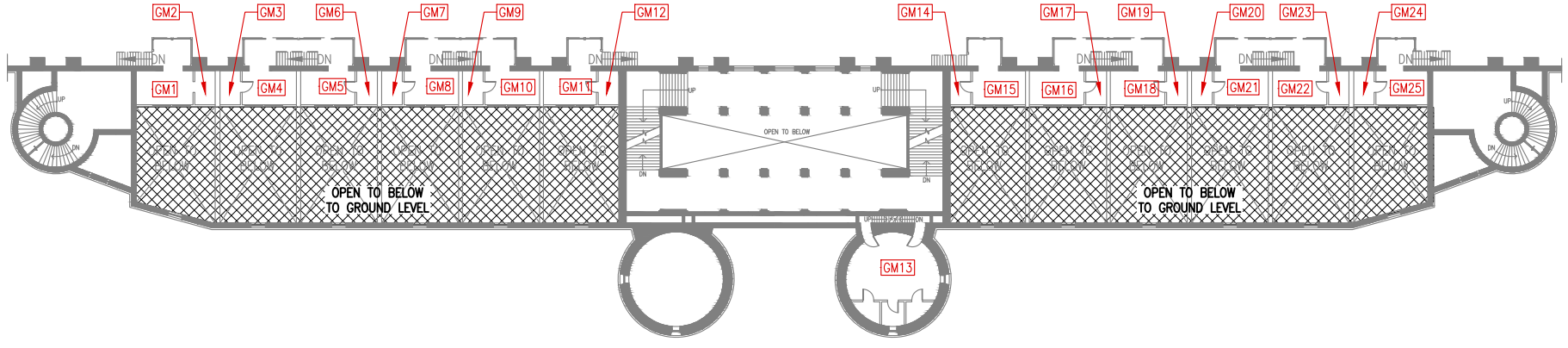
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G30 ---- SPACE ID

PID-1-A ---- ASBESTOS SAMPLING LOCATION

36 ---- LEAD XRF SCREENING LOCATION

N

1
ASL-5

GROUND MEZZANINE

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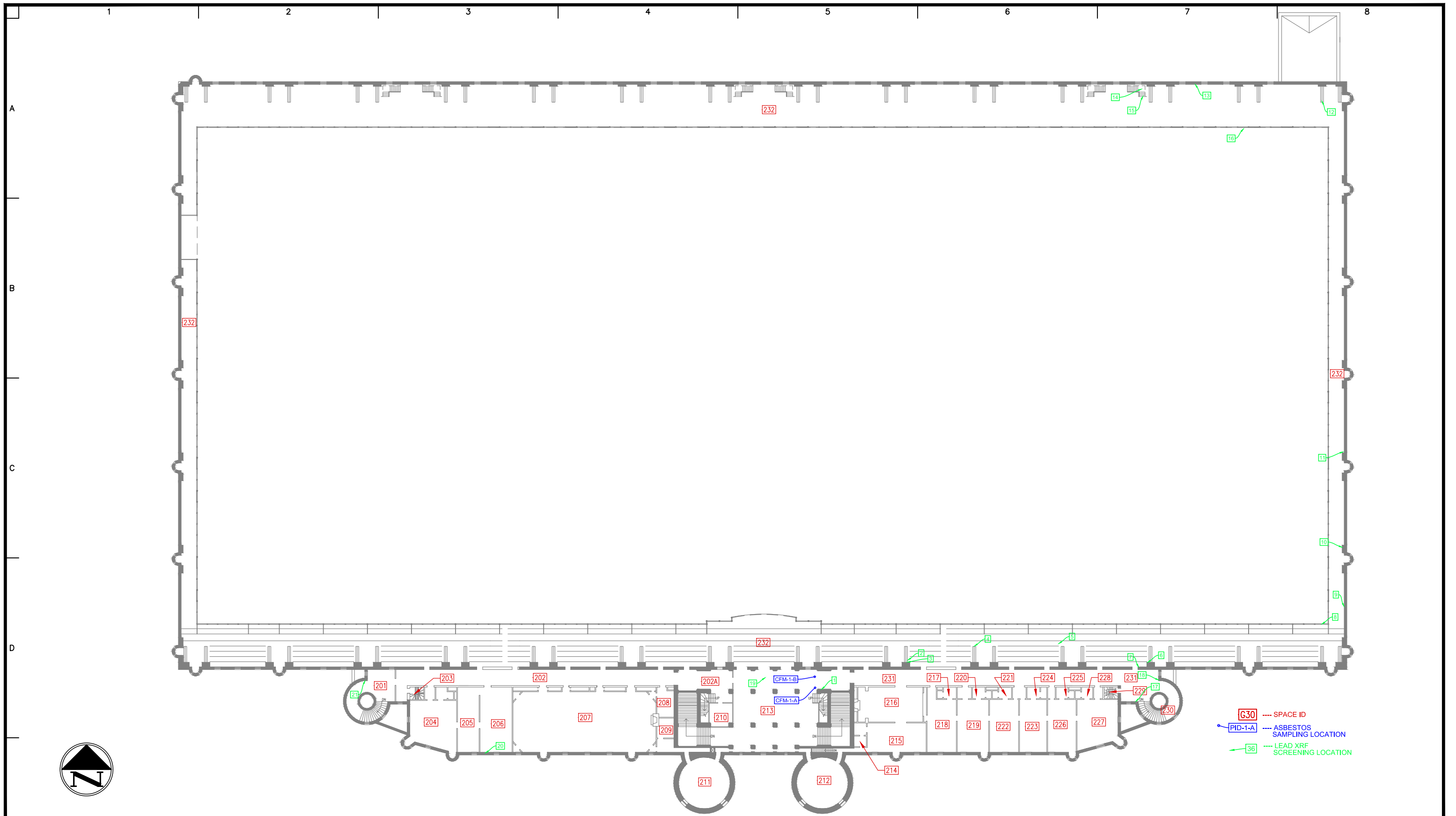
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1 ASL-6 SECOND LEVEL

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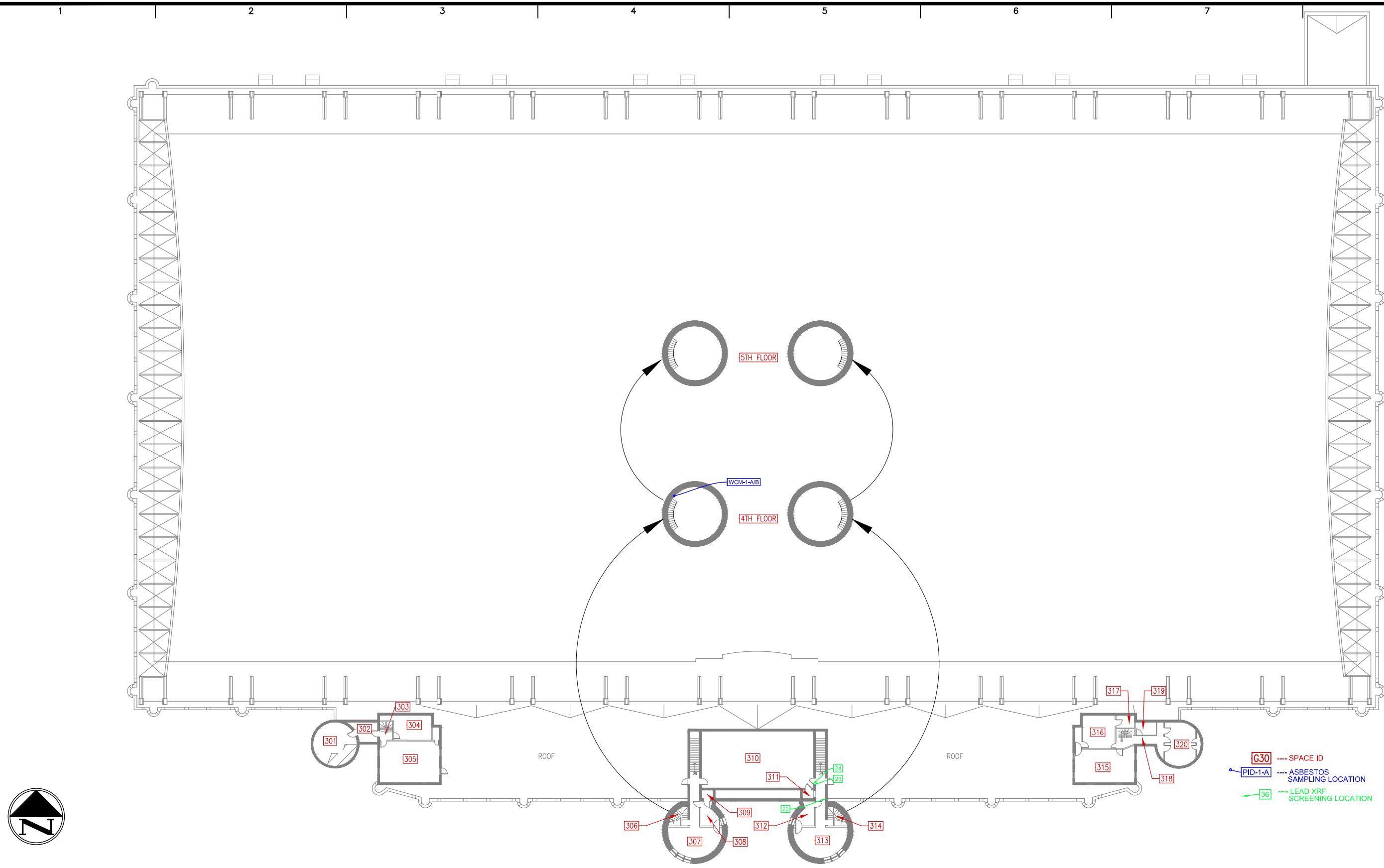
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1 / ASL-7 THIRD LEVEL (+ 4TH AND 5TH LEVELS)
SCALE N.T.S

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Sheet 1 of 7

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A P P E N D I X A

Laboratory Test Results and Chain of Custody Documentation (Asbestos)

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental S
Attn: Vijay Patel
300 Kimball Drive
4th Floor
Parsippany, NJ 07054

Date Received 10/29/19 **AmeriSci Job #** 219104286
Date Examined 10/30/19 **P.O. #**
ELAP # 11480 **Page** 1 **of** 9
RE: 170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WP-1	219104286-01.1	*No*	NAD [1]
WP-1	**Location:** Ground Level East - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-1	219104286-01.2	*No*	NAD
WP-1	**Location:** Ground Level East - Wall Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 2 %, Cellulose 1 %, Non-fibrous 97 %			
WP-2	219104286-02.1	*No*	NAD
WP-2	**Location:** Ground Level West - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-2	219104286-02.2	*No*	NAD
WP-2	**Location:** Ground Level West - Wall Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-3	219104286-03.1	*No*	NAD
WP-3	**Location:** Ground Level Mezzanine West - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WP-3	219104286-03.2	*No*	NAD
WP-3	**Location:** Ground Level Mezzanine West - Wall Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-4	219104286-04.1	*No*	NAD
WP-4	**Location:** Ground Level Mezzanine East - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-4	219104286-04.2	*No*	NAD
WP-4	**Location:** Ground Level Mezzanine East - Wall Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-5	219104286-05.1	*No*	NAD
WP-5	**Location:** Second Floor West - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-5	219104286-05.2	*No*	NAD
WP-5	**Location:** Second Floor West - Wall Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair Trace, Non-fibrous 100 %			
WP-6	219104286-06.1	*No*	NAD
WP-6	**Location:** Second Floor Hallway - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WP-6	219104286-06.2	***No***	NAD
WP-6	**Location:** Second Floor Hallway - Wall Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-7	219104286-07.1	***No***	NAD
WP-7	**Location:** Third Floor - Wall Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WP-7	219104286-07.2	***No***	NAD
WP-7	**Location:** Third Floor - Wall Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 1 %, Cellulose Trace, Non-fibrous 99 %			
CP-1	219104286-08.1	***No***	NAD
CP-1	**Location:** Ground Level West - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
CP-1	219104286-08.2	***No***	NAD
CP-1	**Location:** Ground Level West - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 2 %, Non-fibrous 98 %			
CP-2	219104286-09.1	***No***	NAD
CP-2	**Location:** Ground Level East - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CP-2	219104286-09.2	***No***	NAD
CP-2	**Location:** Ground Level East - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 1 %, Non-fibrous 99 %			
CP-3	219104286-10.1	***No***	NAD
CP-3	**Location:** Ground Level Mezzanine East - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
CP-3	219104286-10.2	***No***	NAD
CP-3	**Location:** Ground Level Mezzanine East - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair Trace, Non-fibrous 100 %			
CP-4	219104286-11.1	***No***	NAD
CP-4	**Location:** Ground Level Mezzanine West - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
CP-4	219104286-11.2	***No***	NAD
CP-4	**Location:** Ground Level Mezzanine West - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 1 %, Cellulose Trace, Non-fibrous 99 %			
CP-5	219104286-12.1	***No***	NAD
CP-5	**Location:** Second Floor West - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CP-5	219104286-12.2	***No***	NAD
CP-5	**Location:** Second Floor West - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 5 %, Non-fibrous 95 %			
CP-6	219104286-13.1	***No***	NAD
CP-6	**Location:** Second Floor East - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
CP-6	219104286-13.2	***No***	NAD
CP-6	**Location:** Second Floor East - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 2 %, Cellulose 1 %, Non-fibrous 97 %			
CP-7	219104286-14.1	***No***	NAD
CP-7	**Location:** Third Floor - Ceiling Plaster (Skim Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
CP-7	219104286-14.2	***No***	NAD
CP-7	**Location:** Third Floor - Ceiling Plaster (Base Coat)		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Animal hair 4 %, Cellulose 1 %, Non-fibrous 95 %			
PID-1-A	219104286-15	***Yes***	0.5 % [2]
PID-1	**Location:** Ground Level East Restrooms - Pipe Insulation Debris in Chase		(EPA 400 PC) by Kensen Caro on 10/30/19
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 0.5 % **Other Material:** Cellulose 95 %, Non-fibrous 4.5 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
PID-1-B PID-1	219104286-16 **Location:** Ground Level East Restrooms - Pipe Insulation Debris in Chase	***Yes***	1.5 % [2] (EPA 400 PC) by Kensen Caro on 10/30/19
Analyst Description: Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 1.5 % **Other Material:** Cellulose 95 %, Non-fibrous 3.5 %			
BLN-1-A BLN-1	219104286-17 **Location:** Sub-Basement - Boiler Room - Boiler Lining (Small Square Boilers)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 70 %, Non-fibrous 30 %			
BLN-1-B BLN-1	219104286-18 **Location:** Sub-Basement - Boiler Room - Boiler Lining (Small Square Boilers)	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: White, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 70 %, Non-fibrous 30 %			
CGD-1-A CGD-1	219104286-19 **Location:** Ground Level Storage Next To West Restrooms - Glue Daubs To Ceiling Tiles	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 46.8 %			
CGD-1-B CGD-1	219104286-20 **Location:** Ground Level Storage Next To West Restrooms - Glue Daubs To Ceiling Tiles	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 43.7 %			
CT-1-A CT-1	219104286-21 **Location:** Ground Level Storage Next To West Restrooms - 12-Inch Ceiling Tile	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
CT-1-B	219104286-22	***No***	NAD
CT-1	**Location:** Ground Level Storage Next To West Restrooms - 12-Inch Ceiling Tile		(by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 28 %			
EAP-1-A	219104286-23	***No***	NAD
EAP-1	**Location:** Ground Level - Electric Arc Protecting Shield		(by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.1 % **Comment:** (NOB) Material			
EAP-1-B	219104286-24	***No***	NAD
EAP-1	**Location:** Ground Level - Electric Arc Protecting Shield		(by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: OffWhite, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.9 % **Comment:** (NOB) Material			
PJ2-1-A	219104286-25	***No***	NAD
PJ2-1	**Location:** Ground Level East Storages - Mud-Packed Pipe Joint Insulation To Fiberglass		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 30 %, Fibrous glass 5 %, Non-fibrous 65 %			
PJ2-1-B	219104286-26	***No***	NAD
PJ2-1	**Location:** Ground Level East Storages - Mud-Packed Pipe Joint Insulation To Fiberglass		(by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 20 %, Fibrous glass 5 %, Non-fibrous 75 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
PJ2-1-C PJ2-1	219104286-27 **Location:** Ground Level East Storages - Mud-Packed Pipe Joint Insulation To Fiberglass	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10 %, Fibrous glass 5 %, Non-fibrous 85 %			
PJ1-1-A PJ1-1	219104286-28 **Location:** Ground Level West Restrooms Chase - Mud-Packed Pipe Joint Insulation To Fiberglass	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 15 %, Non-fibrous 85 %			
PJ1-1-B PJ1-1	219104286-29 **Location:** Ground Level West Restrooms Chase - Mud-Packed Pipe Joint Insulation To Fiberglass	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 15 %, Non-fibrous 85 %			
CFM-1-A CFM-1	219104286-30 **Location:** Second Floor Center - Red Cementitious Floor Material	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
CFM-1-B CFM-1	219104286-31 **Location:** Second Floor Center - Red Cementitious Floor Material	***No***	NAD (by NYS ELAP 198.1) by Kensen Caro on 10/30/19
Analyst Description: Red, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
WCM-1-A WCM-1	219104286-32 **Location:** Fourth Level - Tower - Black Coating On Brick Wall	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 58.7 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WCM-1-B WCM-1	219104286-33 **Location:** Fourth Level - Tower - Black Coating On Brick Wall	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 61.7 %			
WGP-1-A WGP-1	219104286-34 **Location:** Ground Level Storage Next To West Restrooms - Window Glazing Putty	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 8.6 %			
WGP-1-B WGP-1	219104286-35 **Location:** Ground Level Storage Next To West Restrooms - Window Glazing Putty	***No***	NAD (by NYS ELAP 198.6) by Kensen Caro on 10/30/19
Analyst Description: Beige, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.4 %			

Reporting Notes:

(1) This job was - Analyzed using Motic BA310 Pol Scope S/N 1190000538

(2) Analysis Results For Soil, Dust, Or Debris May Be Highly Variable Because Of The Heterogeneous Nature Of These Samples

Analyzed by: Kensen Caro _____

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis by Appd E to Subpt E, 40 CFR 763 (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite or 198.6 for NOB samples or EPA 400 pt ct by Appd E to Subpt E, 40 CFR 763 (NY ELAP Lab 11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab.This PLM report relates ONLY to the items tested. AIHA-LAP, LLC Lab ID 102843, RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054.

Reviewed By:_____ _____END OF REPORT_____

Client Name: Langan Engineering & Environmental Services

Table I
Summary of Bulk Asbestos Analysis Results

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01.1	WP-1	WP-1	----	----	----	----	NAD	NA
Location:	Ground Level East - Wall Plaster (Skim Coat)							
01.2	WP-1	WP-1	----	----	----	----	NAD	NA
Location:	Ground Level East - Wall Plaster (Base Coat)							
02.1	WP-2	WP-2	----	----	----	----	NAD	NA
Location:	Ground Level West - Wall Plaster (Skim Coat)							
02.2	WP-2	WP-2	----	----	----	----	NAD	NA
Location:	Ground Level West - Wall Plaster (Base Coat)							
03.1	WP-3	WP-3	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine West - Wall Plaster (Skim Coat)							
03.2	WP-3	WP-3	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine West - Wall Plaster (Base Coat)							
04.1	WP-4	WP-4	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine East - Wall Plaster (Skim Coat)							
04.2	WP-4	WP-4	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine East - Wall Plaster (Base Coat)							
05.1	WP-5	WP-5	----	----	----	----	NAD	NA
Location:	Second Floor West - Wall Plaster (Skim Coat)							
05.2	WP-5	WP-5	----	----	----	----	NAD	NA
Location:	Second Floor West - Wall Plaster (Base Coat)							
06.1	WP-6	WP-6	----	----	----	----	NAD	NA
Location:	Second Floor Hallway - Wall Plaster (Skim Coat)							
06.2	WP-6	WP-6	----	----	----	----	NAD	NA
Location:	Second Floor Hallway - Wall Plaster (Base Coat)							
07.1	WP-7	WP-7	----	----	----	----	NAD	NA
Location:	Third Floor - Wall Plaster (Skim Coat)							
07.2	WP-7	WP-7	----	----	----	----	NAD	NA
Location:	Third Floor - Wall Plaster (Base Coat)							
08.1	CP-1	CP-1	----	----	----	----	NAD	NA
Location:	Ground Level West - Ceiling Plaster (Skim Coat)							
08.2	CP-1	CP-1	----	----	----	----	NAD	NA
Location:	Ground Level West - Ceiling Plaster (Base Coat)							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
09.1	CP-2	CP-2	----	----	----	----	NAD	NA
Location:	Ground Level East - Ceiling Plaster (Skim Coat)							
09.2	CP-2	CP-2	----	----	----	----	NAD	NA
Location:	Ground Level East - Ceiling Plaster (Base Coat)							
10.1	CP-3	CP-3	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine East - Ceiling Plaster (Skim Coat)							
10.2	CP-3	CP-3	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine East - Ceiling Plaster (Base Coat)							
11.1	CP-4	CP-4	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine West - Ceiling Plaster (Skim Coat)							
11.2	CP-4	CP-4	----	----	----	----	NAD	NA
Location:	Ground Level Mezzanine West - Ceiling Plaster (Base Coat)							
12.1	CP-5	CP-5	----	----	----	----	NAD	NA
Location:	Second Floor West - Ceiling Plaster (Skim Coat)							
12.2	CP-5	CP-5	----	----	----	----	NAD	NA
Location:	Second Floor West - Ceiling Plaster (Base Coat)							
13.1	CP-6	CP-6	----	----	----	----	NAD	NA
Location:	Second Floor East - Ceiling Plaster (Skim Coat)							
13.2	CP-6	CP-6	----	----	----	----	NAD	NA
Location:	Second Floor East - Ceiling Plaster (Base Coat)							
14.1	CP-7	CP-7	----	----	----	----	NAD	NA
Location:	Third Floor - Ceiling Plaster (Skim Coat)							
14.2	CP-7	CP-7	----	----	----	----	NAD	NA
Location:	Third Floor - Ceiling Plaster (Base Coat)							
15	PID-1-A	PID-1	----	----	----	----	Chrysotile 0.5	NA
Location:	Ground Level East Restrooms - Pipe Insulation Debris in Chase							
16	PID-1-B	PID-1	----	----	----	----	Chrysotile 1.5	NA
Location:	Ground Level East Restrooms - Pipe Insulation Debris in Chase							
17	BLN-1-A	BLN-1	----	----	----	----	NAD	NA
Location:	Sub-Basement - Boiler Room - Boiler Lining (Small Square Boilers)							
18	BLN-1-B	BLN-1	----	----	----	----	NAD	NA
Location:	Sub-Basement - Boiler Room - Boiler Lining (Small Square Boilers)							

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Table I

Summary of Bulk Asbestos Analysis Results

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
19	CGD-1-A	CGD-1	0.188	46.8	6.4	46.8	NAD	NAD
Location:	Ground Level Storage Next To West Restrooms - Glue Daubs To Ceiling Tiles							
20	CGD-1-B	CGD-1	0.199	48.2	8.0	43.7	NAD	NAD
Location:	Ground Level Storage Next To West Restrooms - Glue Daubs To Ceiling Tiles							
21	CT-1-A	CT-1	0.270	13.3	59.6	27.0	NAD	NAD
Location:	Ground Level Storage Next To West Restrooms - 12-Inch Ceiling Tile							
22	CT-1-B	CT-1	0.239	11.7	60.3	28.0	NAD	NAD
Location:	Ground Level Storage Next To West Restrooms - 12-Inch Ceiling Tile							
23	EAP-1-A	EAP-1	0.089	97.8	1.1	1.1	NAD	NAD
Location:	Ground Level - Electric Arc Protecting Shield							
24	EAP-1-B	EAP-1	0.114	98.2	0.9	0.9	NAD	NAD
Location:	Ground Level - Electric Arc Protecting Shield							
25	PJ2-1-A	PJ2-1	----	----	----	----	NAD	NA
Location:	Ground Level East Storages - Mud-Packed Pipe Joint Insulation To Fiberglass							
26	PJ2-1-B	PJ2-1	----	----	----	----	NAD	NA
Location:	Ground Level East Storages - Mud-Packed Pipe Joint Insulation To Fiberglass							
27	PJ2-1-C	PJ2-1	----	----	----	----	NAD	NA
Location:	Ground Level East Storages - Mud-Packed Pipe Joint Insulation To Fiberglass							
28	PJ1-1-A	PJ1-1	----	----	----	----	NAD	NA
Location:	Ground Level West Restrooms Chase - Mud-Packed Pipe Joint Insulation To Fiberglass							
29	PJ1-1-B	PJ1-1	----	----	----	----	NAD	NA
Location:	Ground Level West Restrooms Chase - Mud-Packed Pipe Joint Insulation To Fiberglass							
30	CFM-1-A	CFM-1	----	----	----	----	NAD	NA
Location:	Second Floor Center - Red Cementitious Floor Material							
31	CFM-1-B	CFM-1	----	----	----	----	NAD	NA
Location:	Second Floor Center - Red Cementitious Floor Material							
32	WCM-1-A	WCM-1	0.225	16.4	24.9	58.7	NAD	NAD
Location:	Fourth Level - Tower - Black Coating On Brick Wall							
33	WCM-1-B	WCM-1	0.214	12.1	26.2	61.7	NAD	NAD
Location:	Fourth Level - Tower - Black Coating On Brick Wall							
34	WGP-1-A	WGP-1	0.221	15.8	75.6	8.6	NAD	NAD
Location:	Ground Level Storage Next To West Restrooms - Window Glazing Putty							

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Client Name: Langan Engineering & Environmental Services

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Summary of Bulk Asbestos Analysis Results

170321307; Kingsbridge Armory; 29 Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
35	WGP-1-B	WGP-1	0.206	12.1	84.5	3.4	NAD	NAD

Location: Ground Level Storage Next To West Restrooms - Window Glazing Putty

Analyzed by: Khaalid W. Perine_____; Date Analyzed 10/30/2019

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or ELAP 198.1 for New York friable samples or ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or ELAP 198.4; for New York samples; NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, AIHA-LAP, LLC (PLM) Lab ID 102843.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

Reviewed By:_____

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	KINGSBRIDGE ARMORY		
Address:	29 KINGSBRIDGE ROAD BRONX, NEW YORK	Auth. By: Phone No:	Vijay Patel 973.560.4983
Langan Job No.:	170321307	Sampling Date:	10/25/2019
Sampled By/License #:	MIROSLAW BARAN / NYC114570/NYS03-03533 SANJAY PATEL / NYC115945/NYS98-10216		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
1	WP-1	Wall Plaster (2 layers)	Ground Level East	X						
2	WP-2	Wall Plaster (2 layers)	Ground Level West	X						
3	WP-3	Wall Plaster (2 layers)	Ground Level Mezzanine West	X						
4	WP-4	Wall Plaster (2 layers)	Ground Level Mezzanine East	X						
5	WP-5	Wall Plaster (2 layers)	Second Floor West	X						
6	WP-6	Wall Plaster (2 layers)	Second Floor Hallway	X						
7	WP-7	Wall Plaster (2 layers)	Third Floor	X						
8	CP-1	Ceiling Plaster (2 layers)	Ground Level West	X						
9	CP-2	Ceiling Plaster (2 layers)	Ground Level East	X						
10	CP-3	Ceiling Plaster (2 layers)	Ground Level Mezzanine East	X						

Total No. of Samples: #2191042866 10

Turnaround Request:	RUSH	12 hours	24 hours	48 hours	72 hours	5 days
			X			

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to mbaran@langan.com and vpatel@langan.com.

Please analyze all plaster samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
MIROSLAW BARAN	10/28/2019			10/29/19	11:22
Company: LANGAN			Company: AmeriSci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	KINGSBRIDGE ARMORY		
Address:	29 KINGSBRIDGE ROAD BRONX, NEW YORK	Auth. By: Phone No:	Vijay Patel 973.560.4983
Langan Job No.:	170321307	Sampling Date:	10/25/2019
Sampled By/License #:	MIROSLAW BARAN / NYC114570/NYS03-03533 SANJAY PATEL / NYC115945/NYS98-10216		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
11	CP-4	Ceiling Plaster (2 layers)	Ground Level Mezzanine West	X						
12	CP-5	Ceiling Plaster (2 layers)	Second Floor West	X						
13	CP-6	Ceiling Plaster (2 layers)	Second Floor East	X						
14	CP-7	Ceiling Plaster (2 layers)	Third Floor	X						
15	PID-1-A	Pipe Insulation Debris in Chase	Ground Level East Restrooms	X						
16	PID-1-B	Pipe Insulation Debris in Chase	Ground Level East Restrooms	X						
17	BLN-1-A	Boiler Lining (Small square boilers)	Sub-Basement - Boiler Room	X						
18	BLN-1-B	Boiler Lining (Small square boilers)	Sub-Basement - Boiler Room	X						
19	CGD-1-A	Glue Daubs to Ceiling Tiles	Ground Level Storage next to West Restrooms		X	X				
20	CGD-1-B	Glue Daubs to Ceiling Tiles	Ground Level Storage next to West Restrooms		X	X				

Total No. of Samples: #219104286 10

Turnaround Request:	RUSH	12 hours	24 hours	48 hours	72 hours	5 days
			X			

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to mbaran@langan.com and vpatel@langan.com.

Please analyze all plaster samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
MIROSLAW BARAN	10/28/2019			10/29/19	11:22
Company: LANGAN			Company: Amer. Sci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	KINGSBRIDGE ARMORY		
Address:	29 KINGSBRIDGE ROAD BRONX, NEW YORK	Auth. By: Phone No:	Vijay Patel 973.560.4983
Langan Job No.:	170321307	Sampling Date:	10/25/2019
Sampled By/License #:	MIROSLAW BARAN / NYC114570/NYS03-03533 SANJAY PATEL / NYC115945/NYS98-10216		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
21	CT-1-A	12-inch Ceiling Tile	Ground Level Storage next to West Restrooms		X	X				
22	CT-1-B	12-inch Ceiling Tile	Ground Level Storage next to West Restrooms		X	X				
23	EAP-1-A	Electric Arc Protecting Shield	Ground Level	X						
24	EAP-1-B	Electric Arc Protecting Shield	Ground Level	X						
25	PJ2-1-A	Mud-packed Pipe Joint Insulation to Fiberglass	Ground Level East Storages	X						
26	PJ2-1-B	Mud-packed Pipe Joint Insulation to Fiberglass	Ground Level East Storages	X						
27	PJ2-1-C	Mud-packed Pipe Joint Insulation to Fiberglass	Ground Level East Storages	X						
28	PJ1-1-A	Mud-packed Pipe Joint Insulation to Fiberglass	Ground Level West Restrooms Chase	X						
29	PJ1-1-B	Mud-packed Pipe Joint Insulation to Fiberglass	Ground Level West Restrooms Chase	X						
30	CFM-1-A	Red Cementitious Floor Material	Second Floor Center	X						

Total No. of Samples: #2191042866 10

Turnaround Request:	RUSH	12 hours	24 hours	48 hours	72 hours	5 days
			X			

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to mbaran@langan.com and vpatel@langan.com.

Please analyze all plaster samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
MIROSLAW BARAN	10/28/2019			10/29/19	11:22
Company: LANGAN			Company: AmeriSci		

Laboratory Name:

LANGAN
300 Kimball Drive
Parsippany, NJ 07054
Phone: 973-560-4900
Fax: 973-560-4901

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	KINGSBRIDGE ARMORY		
Address:	29 KINGSBRIDGE ROAD BRONX, NEW YORK	Auth. By: Phone No:	Vijay Patel 973.560.4983
Langan Job No.:	170321307	Sampling Date:	10/25/2019
Sampled By/License #:	MIROSLAW BARAN / NYC114570/NYS03-03533 SANJAY PATEL / NYC115945/NYS98-10216		

Sample #	Sample ID	Description of Sample	Sample Location	Analysis Requested for Asbestos: PLM	PLM-NOB	TEM	Analysis Requested for Lead: AAS	TCLP	Analysis Requested for PCB: EPA Method 8082	Results
31	CFM-1-B	Red Cementitious Floor Material	Second Floor Center	X						
32	WCM-1-A	Black Coating on Brick Wall	4th Level - Tower		X	X				
33	WCM-1-B	Black Coating on Brick Wall	4th Level - Tower		X	X				
34	WGP-1-A	Window Glazing Putty	Ground Level Storage next to West Restrooms		X	X				
35	WGP-1-B	Window Glazing Putty	Ground Level Storage next to West Restrooms		X	X				
--										
--										
--		#219104286								
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--										

Total No. of Samples:	5	Turnaround Request:	RUSH	12 hours	24 hours	48 hours	72 hours	5 days
					X			

Laboratory Instructions: Stop analysis @ 1st positive (>1% by weight) for each homogenous sample group. Please e-mail results to mbaran@langan.com and vpatel@langan.com.

Please analyze all plaster samples. Do not stop analysis @ 1st positive (>1% by weight).

Relinquished By:	Date:	Time:	Received by:	Date:	Time:
MIROSLAW BARAN	10/28/2019			10/29/19	11:22
Company: **LANGAN**			Company: AmriSci		

Laboratory Name:

A P P E N D I X B

Langan's Certifications and Laboratory Accreditations

New York State – Department of Labor
Division of Safety and Health
License and Certificate Unit
State Campus, Building 12
Albany, NY 12240

ASBESTOS HANDLING LICENSE

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
4th Floor
300 Kimball Drive

Parsippany, NJ 07054

FILE NUMBER: 13-70336
LICENSE NUMBER: 70336
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 03/07/2019
EXPIRATION DATE: 03/31/2020

Duly Authorized Representative – Vijay Patel:

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Eileen M. Franko, Director
For the Commissioner of Labor

SH 432 (8/12)

NYC DEP ASBESTOS CONTROL PROGRAM

ASBESTOS CERTIFICATE



BAJRAMI,
ADEM
INVESTIGATOR
125555

EXPIRES: 11/9/2020
DOB:11/9/1978 M 6' 02"

MUST BE CARRIED ON ALL ASBESTOS PROJECTS

NYC DEP ASBESTOS CONTROL PROGRAM

ASBESTOS CERTIFICATE



PATEL,
SANJAYKUMAR B
INVESTIGATOR
115945

EXPIRES: 9/18/2019
DOB:9/18/1967 M 5' 11"

MUST BE CARRIED ON ALL ASBESTOS PROJECTS

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S



SANJAYKUMAR PATEL
CLASS(EXPIRES)
C ATEC(09/19) D INSP(09/19)
H PM (09/19)

CERT# 98-10216
DMV# 587051083

MUST BE CARRIED ON ASBESTOS PROJECTS

01213 0047366699 25

EYES BLK
HAIR BLK
HGT 6' 00"

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 161A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

United States Environmental Protection Agency

This is to certify that



Sanjay B Patel

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires November 20, 2021

LBP-R-4543-1
Certification #

September 18, 2018
Issued On

John Gorman, Chief
Pesticides & Toxic Substances Branch

NYC DEP ASBESTOS CONTROL PROGRAM

ASBESTOS CERTIFICATE



BARAN,
MIROSLAW
INVESTIGATOR
114570

EXPIRES: 06/21/2021
DOB:06/21/1972 M 5' 09"

MUST BE CARRIED ON ALL ASBESTOS PROJECTS

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE

N.Y.S



MIROSLAW M BARAN
CLASS(EXPIRES)
C ATEC(06/20) D INSP(06/20)
H PM (06/20)

CERT# 03-03533
DMV# 521159926

MUST BE CARRIED ON ASBESTOS PROJECTS

United States Environmental Protection Agency

This is to certify that



Miroslaw M Baran

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402, and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226 as:

Risk Assessor

In the Jurisdiction of:

All EPA Administered Lead-based Paint Activities Program States, Tribes and Territories

This certification is valid from the date of issuance and expires February 21, 2022

LBP-R-I198699-1
Certification #

February 07, 2019
Issued On

John Gorman, Chief
Pesticides & Toxic Substances Branch

NEW YORK STATE OF OPPORTUNITY. | Department of Health

ANDREW M. CUOMO
Governor

HOWARD A. ZUCKER, M.D., J.D.
Commissioner

SALLY DRESLIN, M.S., R.N.
Executive Deputy Commissioner

LAB ID: 11480

April 01, 2019

MR. PAUL J. MUCHA
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

Certificate Expiration Date:
April 01, 2020

Dear Mr. Mucha,

Enclosed are certificate(s) of approval issued to your environmental laboratory for the current permit year. The certificate(s) supersede(s) any previously issued one(s) and is(are) in effect through the expiration date listed. Please carefully examine the certificate(s) to insure that the categories, subcategories, analytes, and methods for which your laboratory is approved are correct. In addition, verify that your laboratory's name, address, lead technical director, and identification number are accurate.

Pursuant to NYCRR Subpart 55-2.2, original certificates must be posted conspicuously in the laboratory and copies shall be made available to any client of the laboratory upon request.

Pursuant to NYCRR Subpart 55-2.6, any misrepresentation of the fields of accreditation (category - method - analyte) for which your laboratory is approved may result in denial, suspension, or revocation of your certification. Any use of the Environmental Laboratory Approval Program (ELAP) or National Environmental Laboratory Accreditation Program (NELAP) name, reference to the laboratory's approval status, and/or using the NELAP logo in any catalogs, advertising, business solicitations, proposals, quotations, laboratory analytical reports, or other materials must include the laboratory's ELAP identification number and distinguish between testing for which the laboratory is approved and testing for which the laboratory is not approved.

If you have any questions, please contact ELAP at the New York State Department of Health (NYS DOH), Wadsworth Center, PO Box 509, Albany NY, 12201-0509; by phone at (518) 485-5570; by facsimile at (518) 485-5568; and by email at elap@health.ny.gov.

Sincerely,

Victoria Pretti

Victoria Pretti
Director and QA Officer
Environmental Laboratory Approval Program

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2020
Issued April 01, 2019

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL J. MUCHA
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

is hereby APPROVED as an Environmental Laboratory in conformance with the National Environmental Laboratory Accreditation Conference Standards (2003) for the category ENVIRONMENTAL ANALYSES POTABLE WATER
All approved analytes are listed below:

Miscellaneous

Asbestos	EPA 100.2

Serial No.: 59673

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2020
Issued April 01, 2019

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL J. MUCHA
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual
	EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual

Serial No.: 59674

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER

Expires 12:01 AM April 01, 2020
Issued April 01, 2019

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL J. MUCHA
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos	40 CFR 763 APX A No. III
	YAMATE,AGARWAL GIBB
	NIOSH 7402
Fibers	NIOSH 7400 A RULES

Serial No.: 59675

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

NVLAP® National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2017

AmeriSci New York
117 E. 30th Street
New York, NY 10016
Mr. Paul Mucha
Phone: 212-679-8600 Fax: 212-679-2711
Email: pmucha@amerisci.com
http://www.amerisci.com

ASBESTOS FIBER ANALYSIS — NVLAP LAB CODE 200546-0

Bulk Asbestos Analysis

Code	*Description*
18/A01	EPA -- 40 CFR Appendix E to Subpart E of Part 763, Interim Method of the Determination of Asbestos in Bulk Insulation Samples
18/A03	EPA 600/R-93/116: Method for the Determination of Asbestos in Bulk Building Materials

Airborne Asbestos Analysis

Code	*Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

For the National Voluntary Laboratory Accreditation Program

United States Department of Commerce
National Institute of Standards and Technology

Certificate of Accreditation to ISO/IEC 17025:2017

NVLAP LAB CODE: 200546-0

AmeriSci New York

New York, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

Asbestos Fiber Analysis

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated January 2009).

2019-07-01 through 2020-06-30

Effective Dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

For the National Voluntary Laboratory Accreditation Program

A P P E N D I X C

Copy of the October 6, 2008 Asbestos Investigation Report prepared by Langan

LANGAN
ENGINEERING & ENVIRONMENTAL SERVICES

David T. Gockel, P.E., P.P.
George P. Kelley, P.E.
George E. Derrick, P.E.
Michael A. Semeraro, Jr., P.E.
Nicholas De Rose, P.G.
Andrew J. Ciancia, P.E.
George E. Leventis, P.E.
Rudolph P. Frizzi, P.E.
Ronald A. Fuerst, C.L.A.
Colleen Costello, P.G.
Cristina M. Gonzalez, P.E.
Gerald J. Zambrella, C.E.M.

Jorge H. Berkowitz, Ph.D.
Richard Burrow, P.E.
David J. Charette, P.W.S.
Steven A. Ciambruschini, P.G.
Gerald M. Coscia, P.E.
John C. Cote, P.E.
Michael E. Cotreau, P.E.
Daniel D. Disario, P.E.
Michael M. Goldstein
Sam B. Ishak, M.C.S.E.
Robert Y. Koto, P.G.
William G. Lothian, P.E.
Michele E. O'Connor, P.E.
Joseph E. Romano, P.L.S.
Leonard D. Savino, P.E.
Richard R. Steiner, P.E.
Michael Szura, C.L.A., A.S.L.A
Bryan Waisnor, P.E.

Omar Alsamman, Ph.D., P.E.
Ronald D. Boyer, P.E.
Michael J. Fowler, P.E.
Ryan C. Linthicum, P.E.
Vijay Patel
Mark K. Seel, P.E., P.G.
Beverly R. Williams

October 6, 2008

Dean Vanderwarker
Related Retail
60 Columbus Circle
New York, New York 10004

Re: Asbestos Investigation
Kingsbridge Armory
29 West Kingsbridge Road
Bronx, New York
Langan Project No. 5815101

Dear Mr. Vanderwarker:

Langan Engineering and Environmental Services, P.C. (Langan) completed an asbestos investigation of the above referenced building. The purpose of this investigation was to confirm the presence/absence of asbestos containing materials (ACM) within the subject building. The asbestos investigation was performed on September 4, 5, and 8, 2008, by Langan's New York City Department of Environmental Protection Agency (NYCDEP) certified asbestos investigators, Messrs Miroslaw Baran and Sanjay Patel. Langan's certifications are provided in the Attachments.

Site and Building Description

The project site is at the center of a city block bordered by West 195th Street to the north, West Kingsbridge Road to the south, Jerome Avenue to the east, and Reservoir Avenue to the west (Figure 1). Most of the Site is occupied by the landmark Kingsbridge Armory building (Armory), which was constructed on an approximately 200,000-square-foot (sq-ft) footprint between 1912 and 1917 over the abandoned east basin of the Jerome Park Reservoir. The main drill hall at the center of the Armory measures approximately 300 by 600 feet (ft) and is spanned freely by an arched roof framing that rises 110 ft above the drill hall floor. Beneath the drill floor, two cellar levels formerly housed offices, a garage, a gymnasium, rifle and pistol ranges, and rooms for other military functions. The drill hall volume is flanked to the south by a two-story headhouse with a single cellar floor and four towers that contain offices and residential quarters. The eastern portion of the sub-cellar area underlies the Jerome Avenue sidewalk. The sub-cellar of the Armory building is accessible by a ramp that extends from West 195th Street. The Armory is currently owned and operated by the City of New York, and is used for

storage of City property. The heat and hot water to the building was supplied by oil-fired boilers located in the sub-basement.

Observations and Findings

Prior to conducting the field investigation, we reviewed the Environmental Survey Report dated August 24, 2000, prepared by ET Environmental Corporation (ET). The report documented the following building materials to be asbestos containing materials (ACM): Built-up roofing and flashing materials, Roof shingle, Various colors 9-inch square floor tiles, Air-cell and magnesia pipe and pipe joint insulation, Mud-pack pipe joint insulation associated with fiberglass pipe insulation, Window caulking and glazing putty, and Caulking associated with exterior joints, seams and cracks. The wall and ceiling plaster, boiler breeching and insulation, grey floor coating, various ceiling tiles and panels, wallboard and joint compound were documented to be non-ACM.

During Langan's investigation, suspect materials observed in the building were documented, assessed, quantified, and sampled, as necessary. In addition to the materials identified in ET report, Langan observed the following suspect materials which were not addressed: Baseboard Molding Glue, Pyroblock, Pressboard material, Wire wrap insulation, Electric ebony/Transite switch panel, Safety switch backing material, Vibration dumper cloth, Floor joint fill material, Wall panel glue, Mirror glue, Exterior and interior door caulking, Black and brown linoleum, 9-inch square beige floor tile and associated mastic, Black floor tile and associated mastic under plywood, 12-inch square beige floor tile and associated mastic, 12-inch square tan wood design floor tile and associated mastic, 12-inch square terracotta floor tile and associated mastic, 12-inch square dark brown floor tile and associated mastic, Mastic associated with various 9-ich square floor tiles, Pipe insulation debris mixed with plaster, wood and contaminated construction debris.

A total of sixty-six (66) bulk samples of the observed suspect materials were collected during our investigation. Samples were analyzed by AmeriSci laboratory of New York, New York. AmeriSci is accredited by the Environmental Laboratory Accreditation Program (ELAP) and National Voluntary Laboratory Accreditation Program (NVLAP). A copy of laboratory test results, chain-of–custody documentation, and Laboratory's accreditations is provided in the Attachments.

Findings

According to USEPA, a material with an asbestos content greater than one percent by weight is considered as an asbestos-containing material. Consequently, the following materials in the building were identified to be ACM:

- Pipe and Joint Insulation = 9,048 linear feet
- Wire wrap insulation = 26,500 linear feet

- Electric Transite switch panel= 45 square feet
- Floor joint fill material =1,800 square feet
- Wall panel glue = 1,600 square feet
- Mirror glue = 20 square feet
- Various types of floor tiles/mastic (9-inch square beige floor tile and associated mastic, Black floor tile and associated mastic under plywood, 12-inch square tan wood design floor tile and associated mastic, 12-inch square terracotta floor tile and associated mastic, and Mastic associated with various 9-inch square floor tiles) = 28,100 square feet
- Exterior and interior door caulking = 208 Masonry openings
- Original built-up roofing and flashing materials = 50 square feet
- Pipe insulation debris mixed with plaster, wood and other construction debris = 58,700 square feet plus additional 40 cubic yards

The baseboard molding glue, Pyroblock, pressboard material, safety switch backing material, vibration dumper cloth, black and brown linoleum, 12-inch square beige floor tile and associated mastic, 12-inch square dark brown floor tile and associated mastic were identified to be non-ACM. A summary of the asbestos survey findings is provided in attached Table 1.

The ET report documented the built-up roofing material. Apparently, the building was observed to have fairly new built-up roofing. Based on our field observations and review of the Building Department records, it appears that as part of 2002 exterior restoration project, the built-up roofing materials and several windows in the building were replaced. Any roof cuts would void existing warranty, and therefore, the roofs were not sampled during our investigation.

Conclusions and Recommendations

Asbestos-containing materials were identified in friable and non-friable forms in the subject building. All confirmed and presumed ACM in the building that is to be left in place should be managed in good condition under an Operations and Management (O & M) plan. The purpose and objective of the O & M Plan is to maintain the assumed, presumed or known asbestos containing materials in good condition, prevent future release of asbestos fibers, and minimize exposure of all building occupants to asbestos fibers.

Asbestos containing debris from damaged pipe insulation was observed throughout the building. Access to the building should be restricted until the clean-up work is completed.

ACM that would be impacted by planned renovation must be properly removed prior to performing such activities. Refer to Table 1 for the summary of asbestos inspection findings. The removal and disposal of ACM must be performed by a NYS-DOL licensed asbestos handling contractor in accordance with Federal, state, and local regulations. Proper notifications must be filed with the US-EPA, NYS-DOL, NYC-DEP and other regulatory agencies prior to performing such activities.

Abatement design documents should be prepared to identify the locations of ACM removal and specify removal work practices.

As required by the NYS-DOL and NYC-DEP regulations, the abatement project must be monitored by a NYS-DOL certified project monitor. The project monitor oversees contractor's work practices to ensure regulatory compliance and also performs pre, during, and final clearance post abatement air sampling in accordance with the state and city regulations.

In addition to ACM, lead based paint was observed throughout the building. The paint was flaking, cracking, with debris lying on the floor. Apparently, paint stabilization work was performed in the basement and sub-basement. In addition to LBP, suspect PCB/Mercury containing electrical articles were observed throughout the building.

Estimated Remediation Cost

Budgetary estimates for asbestos abatement are provided in Attachments.

The cost for the removal of visually observed ACM/contaminated debris, removal of PCB/Mercury containing electrical articles, and remediation/stabilization of damaged paint in the building is estimated to be approximately **$ 1,350,000,** including preparation of abatement design documents, project monitoring, air sample analysis, and closeout documentation.

We trust that this report will satisfy your requirements. If you have any questions regarding this report, please call me at 201-794-6900.

Sincerely,
Langan Engineering & Environmental Services, P.C.

Vijay Patel
Associate

Cc: Joel Landes– Langan

Attachments: Table 1 - Summary of Asbestos Survey Findings,
Table 2 - Budgetary Estimate for Asbestos Abatement,
Results of Laboratory Analyses and Chain-of-Custody Documentation, and
Langan certifications and Laboratory accreditations

Table 1 – Summary of Asbestos Survey Findings

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Sub-Basement				
Original mud-pack pipe joint insulation associated w/ fiberglass	ACM	3 joints	Fair	—
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Boiler gasket	Non-ACM	—	Good	—
Boiler edge patch material	Non-ACM	—	Good	—
Breeching insulation	Non-ACM	—	Good	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Wall plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Basement				
Original mud-pack pipe joint insulation associated w/ fiberglass	ACM	20 joints	Fair to poor	—
Block and air-cell pipe insulation	ACM	4,350 LF	Poor	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	ACM	39,000 SF	—	The average thickness of the debris layer in majority of the contaminated area was one inch; however, in several locations, thickness of debris layer reached up to two feet.
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	ACM	25 CY	—	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Various types of floor tile and associated mastic	ACM	300 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM.
Electrical wire insulation	ACM	10,000 LF	Unknown	—
Interior door caulking	ACM	3 door openings	Good	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Vibration dumper cloth	Non-ACM	—	Good to fair	—
Electric panel board	Non-ACM	—	Good to fair	—
Pressboard material	Non-ACM	—	Good to fair	—
Cove base and associated mastic	Non-ACM	—	Fair	—
Pyroblock	Non-ACM	—	Unknown	—
Basement Mezzanine				
Block and air-cell pipe insulation	ACM	1,125 LF	Poor	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	ACM	17,500 SF	—	The average thickness of the debris layer in majority of the contaminated area was one inch; however, in several locations, thickness of debris layer reached up to two feet.
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	ACM	10 CY	—	—
Various types of floor tile and associated mastic	ACM	5,500 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. At the eastern section of Basement Mezzanine ACM floor tiles and mastic were observed to be covered with layer of plywood and non-ACM floor tiles.
Electrical wire insulation	ACM	3,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Vibration dumper cloth	Non-ACM	—	Good to fair	—
Electric panel board	Non-ACM	—	Good to fair	—
Cove base and associated mastic	Non-ACM	—	Fair	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Pyroblock	Non-ACM	—	Unknown	—
1st Floor				
Block and air-cell pipe insulation	ACM	120 LF	Fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe open ends were observed.
Pipe insulation debris mixed with plaster on the floor.	ACM	300 SF	—	—
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	ACM	5 CY	—	—
Various types of floor tile and associated mastic	ACM	9,500 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. At one location ACM floor tiles and mastic were observed to be covered with layer of plywood.
Ebony/Transite Electric switch panel	ACM	45 SF	Good to fair	—
Electrical wire insulation	ACM	10,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
New mud-pack pipe joint insulation associate w/ fiberglass	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Vibration dumper cloth	Non-ACM	—	Good to fair	—
Cove base and associated mastic	Non-ACM	—	Fair	—
1st Floor Mezzanine				
Pipe insulation debris mixed with plaster on the floor.	ACM	500 SF	—	—
Various types of floor tile and associated mastic	ACM	1,600 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM.
Electrical wire insulation	ACM	1,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Cove base and associated mastic	Non-ACM	—	Fair	—
2nd Floor				
Block and air-cell pipe insulation	ACM	250 LF	Fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.
Pipe insulation debris on suspended ceiling plaster.	ACM	600 SF	—	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Various types of floor tile and associated mastic	ACM	7,700 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. Hardwood flooring underneath floor tiles was mouldered and was in poor condition. Hardwood flooring was installed on concrete sub-flooring.
Wall panel glue	ACM	1,600 SF	—	—
Mirror glue	ACM	20 SF	—	—
Electrical wire insulation	ACM	2,000 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Cove base and associated mastic	Non-ACM	—	Fair	—
3rd Floor and 4th Tower Level				
Block and air-cell pipe insulation	ACM	180 LF	Fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. Pipe gauges, dents, and open ends were observed.
Pipe insulation debris mixed with plaster on the floor.	ACM	1,000 SF	—	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Various types of floor tile and associated mastic	ACM	3,500 SF	Fair to poor	Most of the identified floor tiles were confirmed positive as per ET Environmental Corp. report dated August 24, 2000 and recent Langan's investigation. Mastic associated with these floor tiles was sampled and analyzed during recent Langan's investigation and was confirmed to be ACM. Up to two layers of floor tile/covering and mastic were observed at isolated locations. Hardwood flooring underneath floor tiles was mouldered and was in poor condition. Hardwood flooring was installed on concrete sub-flooring.
Electrical wire insulation	ACM	500 LF	Unknown	—
Wall and ceiling plaster	Non-ACM	—	Poor	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Sheetrock wallboard and joint compound	Non-ACM	—	Good to fair	Confirmed negative as per ET Environmental Corp. report dated August 24, 2000.
Cove base and associated mastic	Non-ACM	—	Fair	—
Roofs and Exteriors				
Original built-up roofing, flashing and mastic materials	ACM	50 SF	Good	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. See Note 1.
Window caulking and glazing putty	ACM	200 masonry window openings	Good to fair	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000.
Exterior door caulking	ACM	5 masonry door openings	Good	—
Floor joint fill material along perimeter building walls.	ACM	1,800 LF	Good	—

TABLE 1
SUMMARY OF ASBESTOS SURVEY FINDINGS
KINGSBRIDGE ARMORY
29 KINGSBRIDGE ROAD
BRONX, NEW YORK

Homogeneous Material	ACM or Non-ACM	Approximate Quantity of ACM	Condition	Comments
Caulking on gable ends and clerestory bands	ACM	12,000 SF of surface impacted by caulking presence	—	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000.
Inaccessible areas				
Block and air-cell pipe insulation	ACM	3,000 LF	Unknown	Confirmed positive as per ET Environmental Corp. report dated August 24, 2000. An allowance is provided for the presence of concealed ACM pipe insulation within wall and ceiling cavities.
Pipe insulation debris mixed with plaster on the floor and floor covering.	ACM	1,000 SF	—	An allowance is provided for the presence of concealed ACM pipe insulation within inaccessible building spaces.

Notes:

1. The ET report documented the built-up roofing material. Apparently, the building was observed to have fairly new built-up roofing. Based on our field observations and review of the Building Department records, it appears that as part of 2002 exterior restoration project, the built-up roofing materials and several windows in the building were replaced. Any roof cuts would void existing warranty, and therefore, the roofs were not sampled during our investigation.
2. Any suspect material that is not listed in this report must be presumed ACM until confirmed via laboratory testing.

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Table 2 – Budgetary Estimate for Asbestos Abatement

TABLE 2
BUDGETARY ESTIMATE FOR HAZMAT ABATEMENT
Kingsbridge Armory
29 West Kingsbridge Road
BRONX, NEW YORK

ACM or Presumed ACM	Quantity of ACM or Presumed ACM	Unit Price	Budgetary Estimate
SUB-BASEMENT			
Original mud-pack pipe joint insulation associated w/ fiberglass	3 Joint	$500	$1,500
BASEMENT			
Original mud-pack pipe joint insulation associated w/ fiberglass	20 joint	$15	$300
Block and air-cell pipe insulation	4,350 LF	$18	$78,300
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	39,000 SF	$5	$195,000
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	25 CY	$300	$7,500
Various types of floor tile and associated mastic	300 SF	$7	$2,100
Electrical wire insulation	10,000 LF	$3	$30,000
Interior door caulking	3 DO	$100	$300
BASEMENT MEZZANINE			
Block and air-cell pipe insulation	1,125 LF	$12	$13,500
Pipe insulation debris mixed with plaster, wood and other construction debris on the floor.	17,500 SF	$5	$87,500
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	10 CY	$300	$3,000
Various types of floor tile and associated mastic	5,500 SF	$7	$38,500
Electrical wire insulation	3,000 LF	$3	$9,000
FIRST FLOOR			
Block and air-cell pipe insulation	120 LF	$50	$6,000
Pipe insulation debris mixed with plaster on the floor.	300 SF	$10	$3,000
Pipe insulation debris mixed with plaster, wood and other construction debris in black plastic bags.	5 CY	$300	$1,500
Various types of floor tile and associated mastic	9,500 SF	$7	$66,500
Ebony/Transite Electric switch panel	45 SF	$15	$675
Electrical wire insulation	10,000 LF	$3	$30,000
FIRST FLOOR MEZZANINE			
Pipe insulation debris mixed with plaster on the floor.	500 SF	$5	$2,500
Various types of floor tile and associated mastic	1,600 SF	$7	$11,200
Electrical wire insulation	1,000 LF	$3	$3,000

BUDGETARY ESTIMATE FOR HAZMAT ABATEMENT
Kingsbridge Armory
29 West Kingsbridge Road
BRONX, NEW YORK

ACM or Presumed ACM	Quantity of ACM or Presumed ACM	Unit Price	Budgetary Estimate
SECOND FLOOR			
Block and air-cell pipe insulation	250 LF	$15	$3,750
Pipe insulation debris on suspended ceiling plaster.	600 SF	$5	$3,000
Various types of floor tile and associated mastic	7,700 SF	$7	$53,900
Wall panel glue	1,600 SF	$6	$9,600
Mirror glue	20 SF	$6	$120
Electrical wire insulation	2,000 LF	$3	$6,000
THIRD FLOOR AND FOURTH TOWER LEVEL			
Block and air-cell pipe insulation	180 LF	$30	$5,400
Pipe insulation debris mixed with plaster on the floor.	1,000 SF	$5	$5,000
Various types of floor tile and associated mastic	3,500 SF	$7	$24,500
Electrical wire insulation	500 LF	$3	$1,500
ROOFS AND EXTERIORS			
Original built-up roofing, flashing and mastic materials	50 SF	$50	$2,500
Window caulking and glazing putty	200 WO	$500	$100,000
Exterior door caulking	5 DO	$100	$500
Floor joint fill material along perimeter building walls.	1,800 LF	$5	$9,000
INACCESSIBLE AREAS			
Block and air-cell pipe insulation concealed within wall and ceiling cavities	3,000 LF	$35	$105,000
Pipe insulation debris mixed with plaster on the floor and floor covering.	100 SF	$10	$1,000
TOTAL ASBESTOS ABATEMENT ESTIMATES			**$920,645**
ESTIMATED COST FOR THE MANAGEMENT AND REMEDIATION OF LEAD BASED PAINTED COMPONENTS			**$229,355**
ESTIMATED COST FOR THE REMOVAL OF PCB/MERCURY CONTAINING ELECTRICAL ARTICLES			**$50,000**
ESTIMATED TOTAL FOR PREPARATION OF DESIGN DOCUMENTS, PROJECT MONITORING, AIR SAMPLE ANALYSIS, CLOSURE REPORT, AND SUBMITTAL REVIEW			**$150,000**
ESTIMATED TOTAL FOR THE REMEDIATION OF HAZMAT			**$1,350,000**

Notes:

1. The aforementioned unit prices for asbestos removal are based on the location, size and complexity of the project, and assume that all abatement work will be completed in one phase. These estimates are for budgetary purposes only. Actual removal cost may vary depending upon the market conditions and time of the year ACM are being removed, and work phasing. The estimates include the cost for insurance, overhead, material, labor, disposal permits, OSHA sampling and analysis, and profits. Additionally, the estimated cost is also based on the assumption that union labor wage rate will be used for the workers' and supervisors' wages.

Results of Laboratory/ Chain-of-Custody

LANGAN

AmeriSci New York
117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Langan Engineering & Environmental S
Attn: Vijay Patel
River Drive Center 1

Elmwood Park, NJ 07407

Date Received 09/12/08 **AmeriSci Job #** 208092383
Date Examined 09/15/08 **P.O. #**
ELAP # 11480 **Page** 1 **of** 15
RE: 5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
PYB-1-A 1	208092383-01 **Location:** Pyro Blocks; 1st Floor	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
PYB-1-B 1	208092383-02 **Location:** Pyro Blocks; 1st Floor	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
BG-1-A 2	208092383-03 **Location:** Boiler Gasket; Boiler Room In Sub Basement	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 95 %, Non-fibrous 5 %			
BG-1-B 2	208092383-04 **Location:** Boiler Gasket; Boiler Room In Sub Basement	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Tan/Brown, Heterogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 75 %, Non-fibrous 25 %			
BEP-1-A 3	208092383-05 **Location:** Boiler Edge Patch Material; Boiler Room In Sub Basement	*No*	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 20 %, Non-fibrous 80 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BEP-1-B 3	208092383-06 **Location:** Boiler Edge Patch Material; Boiler Room In Sub Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Fibrous glass 20 %, Non-fibrous 80 %			
PB-1-A 4	208092383-07 **Location:** Pressboard Material; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 95 %, Non-fibrous 5 %			
PB-1-B 4	208092383-08 **Location:** Pressboard Material; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 95 %, Non-fibrous 5 %			
WI-1-A 5	208092383-09 **Location:** Wire Wrap Insulation; Seating Area	***Yes***	14 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 14.0 % **Other Material:** Non-fibrous 48.9 %			
WI-1-B 5	208092383-10 **Location:** Wire Wrap Insulation; Seating Area		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
EB-1-A 6	208092383-11 **Location:** Electric Panel Board; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
EB-1-B 6	208092383-12 **Location:** Electric Panel Board; Basement	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 100 %			
SSB-1-A 7	208092383-13 **Location:** Safety Switch Backing Material; Seat Level	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10 %, Non-fibrous 90 %			
SSB-1-B 7	208092383-14 **Location:** Safety Switch Backing Material; Seat Level	***No***	NAD (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Cementitious, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 10 %, Non-fibrous 90 %			
TR-1-A 8	208092383-15 **Location:** Transite Electrical Panel; 1st Floor	***Yes***	22.2 % (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Cementitious, Bulk Material **Asbestos Types:** Chrysotile 22.2 % **Other Material:** Non-fibrous 77.8 %			
TR-1-B 8	208092383-16 **Location:** Transite Electrical Panel; 1st Floor		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
DB-1-A 9	208092383-17 **Location:** Debris On The Floor Pipe Insulation; Basement	***Yes***	50 % (by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 50.0 % **Other Material:** Non-fibrous 50 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
DB-1-B	208092383-18		NA/PS
9	**Location:** Debris On The Floor Pipe Insulation; Basement		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
FLEX-1-A	208092383-19	***No***	NAD
10	**Location:** Vibration Damper Cloth; Basement		(by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 90 %, Non-fibrous 10 %			
FLEX-1-B	208092383-20	***No***	NAD
10	**Location:** Vibration Damper Cloth; Basement		(by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Cellulose 90 %, Non-fibrous 10 %			
MPJ-1-A	208092383-21	***Yes***	44.4 %
11	**Location:** Mud Pack Pipe Joint Attached With Old Fiberglass Pipe Insulation; Center Restroom On South Side- Basement		(by NYS ELAP 198.1) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Fibrous, Bulk Material **Asbestos Types:** Chrysotile 44.4 % **Other Material:** Non-fibrous 55.6 %			
FJF-1-A	208092383-22	***Yes***	1.5 %
12	**Location:** Floor Joint Fill Material; Exterior- West Side By Building Wall		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 1.5 % **Other Material:** Non-fibrous 4.9 %			
FJF-1-B	208092383-23		NA/PS
12	**Location:** Floor Joint Fill Material; Exterior- West Side By Building Wall		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
WPG-1-A	208092383-24	***Yes***	7.2 %
13	**Location:** Wooden Wall Panel Glue; 2nd Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 7.2 % **Other Material:** Non-fibrous 48.7 %			
WPG-1-B	208092383-25		NA/PS
13	**Location:** Wooden Wall Panel Glue; 2nd Floor		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
WGL-1-A	208092383-26	***No***	NAD
14	**Location:** Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 45.4 %			
WGL-1-B	208092383-27	***No***	NAD
14	**Location:** Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 44.4 %			
MG-1-A	208092383-28	***Yes***	3.2 %
15	**Location:** Mastic Attached With Mirrors On The Wall; 2nd Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.2 % **Other Material:** Non-fibrous 55.1 %			
MG-1-B	208092383-29		NA/PS
15	**Location:** Mastic Attached With Mirrors On The Wall; 2nd Floor		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
IDC-1-A 16	208092383-30 **Location:** Interior Door Caulking; Basement	***Yes***	6.1 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.0 %, Anthophyllite 3.0 % **Other Material:** Fibrous Talc 10 %, Non-fibrous 34 %			
IDC-1-B 16	208092383-31 **Location:** Interior Door Caulking; Basement		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
DC-1-A 17	208092383-32 **Location:** Door Caulking; Exterior	***Yes***	2.4 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 2.4 %, Anthophyllite <1 % pc **Other Material:** Fibrous glass 5 %, Non-fibrous 30.1 %			
DC-1-B 17	208092383-33 **Location:** Door Caulking; Exterior		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
WC-1-A 18	208092383-34 **Location:** Window Caulking; Exterior	***Yes***	3.4 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 1.7 %, Anthophyllite 1.7 % **Other Material:** Fibrous Talc 5 %, Non-fibrous 34.5 %			
WC-1-B 18	208092383-35 **Location:** Window Caulking; Exterior		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BBM-1-A 19	208092383-36L1 **Location:** Covebase; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.5 %			
BBM-1-A 19	208092383-36L2 **Location:** Covebase Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.2 %			
BBM-1-B 19	208092383-37L1 **Location:** Covebase; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 25.9 %			
BBM-1-B 19	208092383-37L2 **Location:** Covebase Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.9 %			
BBM-2-A 20	208092383-38L1 **Location:** 6" Black Covebase; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.8 %			
BBM-2-A 20	208092383-38L2 **Location:** 6" Black Covebase Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.3 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
BBM-2-B 20	208092383-39L1 **Location:** 6" Black Covebase; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 29.3 %			
BBM-2-B 20	208092383-39L2 **Location:** 6" Black Covebase Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.6 %			
FC-1-A 21	208092383-40 **Location:** Black Linoleum Floor Covering; Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.1 %			
FC-1-B 21	208092383-41 **Location:** Black Linoleum Floor Covering; Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 18 %			
FC-2-A 22	208092383-42 **Location:** Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.3 %			
FC-2-B 22	208092383-43 **Location:** Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 16.1 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-1-A 23	208092383-44 **Location:** 9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side	***Yes***	4 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 4.0 % **Other Material:** Non-fibrous 17.8 %			
FT-1-B 23	208092383-45 **Location:** 9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side		NA/PS
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
FT-2A 24	208092383-46L1 **Location:** L1: 12" Sq. White Floor Tile; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 0.9 %			
FT-2A 24	208092383-46L2 **Location:** L1: 12" Sq. White Floor Tile Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.5 %			
FT-2A 24	208092383-46L3 **Location:** L2: 12" Sq. Beige Floor Tile; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.4 %			
FT-2A 24	208092383-46L4 **Location:** L2: 12" Sq. Beige Floor Tile Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.6 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-2-B 24	208092383-47L1 **Location:** L1: 12" Sq. White Floor Tiles; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: OffWhite, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.8 %			
FT-2-B 24	208092383-47L2 **Location:** L1: 12" Sq. White Floor Tiles Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.7 %			
FT-2-B 24	208092383-47L3 **Location:** L2: 12" Sq. Beige Floor Tiles; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 3.4 %			
FT-2-B 24	208092383-47L4 **Location:** L2: 12" Sq. Beige Floor Tiles Mastic; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 5.6 %			
FT-2-C 24	208092383-48L1 **Location:** 12" Sq. Beige Floor Tiles - Only 1 Layer; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 6.9 %			
FT-2-C 24	208092383-48L2 **Location:** 12" Sq. Beige Floor Tiles Mastic- Only 1 Layer; Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 7 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-3-A	208092383-49L1	***Yes***	6.9 %
25	**Location:** Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 6.9 % **Other Material:** Non-fibrous 34.6 %			
FT-3-A	208092383-49L2	***No***	NAD
25	**Location:** Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.8 %			
FT-3-B	208092383-50L1		NA/PS
25	**Location:** Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2		
Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**			
FT-3-B	208092383-50L2	***Yes***	Trace (<0.25 % pc)
25	**Location:** Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2		(ELAP 198.6; 400pc) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile <0.25 % pc **Other Material:** Non-fibrous 9.8 %			
FT-4-A	208092383-51L1	***Yes***	5.5 %
26	**Location:** 12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 5.5 % **Other Material:** Non-fibrous 23.5 %			
FT-4-A	208092383-51L2	***No***	NAD
26	**Location:** 12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Brown/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.5 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-4-B 26	208092383-52L1 **Location:** 12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine		NA/PS
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
FT-4-B 26	208092383-52L2 **Location:** 12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Brown/Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.8 %		
FT-5-A 27	208092383-53L1 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor	***Yes***	3.7 % (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Red, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** Chrysotile 3.7 % **Other Material:** Non-fibrous 25.7 %		
FT-5-A 27	208092383-53L2 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 27.1 %		
FT-5-B 27	208092383-54L1 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor		NA/PS
	Analyst Description: Bulk Material **Asbestos Types:** **Other Material:**		
FT-5-B 27	208092383-54L2 **Location:** 12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
	Analyst Description: Tan, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 29.1 %		

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
FT-6-A 28	208092383-55L1 **Location:** 12" Sq. Dark Brown Floor Tile; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.5 %			
FT-6-A 28	208092383-55L2 **Location:** 12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 19.8 %			
FT-6-B 28	208092383-56L1 **Location:** 12" Sq. Dark Brown Floor Tile; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Grey, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.3 %			
FT-6-B 28	208092383-56L2 **Location:** 12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 12.7 %			
MA-1-A 29	208092383-57 **Location:** Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 9.7 %			
MA-1-B 29	208092383-58 **Location:** Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine	***No***	NAD (by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 24.8 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MA-2-A	208092383-59	***No***	NAD
30	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.7 %			
MA-2-B	208092383-60	***No***	NAD
30	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.8 %			
MA-3-A	208092383-61	***No***	NAD
31	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 2.7 %			
MA-3-B	208092383-62	***No***	NAD
31	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 1.9 %			
MA-4-A	208092383-63	***No***	NAD
32	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 11.4 %			
MA-4-B	208092383-64	***No***	NAD
32	**Location:** Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material **Asbestos Types:** **Other Material:** Non-fibrous 10.7 %			

See Reporting notes on last page

PLM Bulk Asbestos Report

5815101; Kingsbridge Armory; 29 West Kingsbridge Road,
Bronx, New York

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MA-5-A	208092383-65	***No***	NAD
33	**Location:** Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 6.8 %			
MA-5-B	208092383-66	***No***	NAD
33	**Location:** Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine		(by NYS ELAP 198.6) by John P. Koubiadis on 09/15/08
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 4.3 %			

Reporting Notes:

Analyzed by: John P. Koubiadis

*NAD/NSD =no asbestos detected; NA =not analyzed; NA/PS=not analyzed/positive stop; PLM Bulk Asbestos Analysis by EPA 600/M4-82-020 per 40 CFR 763 (NVLAP Lab Code 200546-0), ELAP PLM Method 198.1 for NY friable samples or 198.6 for NOB samples (NY ELAP Lab ID11480); Note:PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non asbestos-containing in NY State (also see EPA Advisory for floor tile,FR 59,146,38970,8/1/94). National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab. This PLM report relates ONLY to the items tested. AIHA Lab # 102843.

Reviewed By: _____

_____END OF REPORT_____

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	PYB-1-A	1	----	----	----	----	NAD	NA
Location:	Pyro Blocks; 1st Floor							
02	PYB-1-B	1	----	----	----	----	NAD	NA
Location:	Pyro Blocks; 1st Floor							
03	BG-1-A	2	----	----	----	----	NAD	NA
Location:	Boiler Gasket; Boiler Room In Sub Basement							
04	BG-1-B	2	----	----	----	----	NAD	NA
Location:	Boiler Gasket; Boiler Room In Sub Basement							
05	BEP-1-A	3	----	----	----	----	NAD	NA
Location:	Boiler Edge Patch Material; Boiler Room In Sub Basement							
06	BEP-1-B	3	----	----	----	----	NAD	NA
Location:	Boiler Edge Patch Material; Boiler Room In Sub Basement							
07	PB-1-A	4	----	----	----	----	NAD	NA
Location:	Pressboard Material; Basement							
08	PB-1-B	4	----	----	----	----	NAD	NA
Location:	Pressboard Material; Basement							
09	WI-1-A	5	1.276	19.2	17.9	48.9	Chrysotile 14.0	NA
Location:	Wire Wrap Insulation; Seating Area							
10	WI-1-B	5	1.123	21.8	16.9	61.3	NA/PS	NA
Location:	Wire Wrap Insulation; Seating Area							
11	EB-1-A	6	----	----	----	----	NAD	NA
Location:	Electric Panel Board; Basement							
12	EB-1-B	6	----	----	----	----	NAD	NA
Location:	Electric Panel Board; Basement							
13	SSB-1-A	7	----	----	----	----	NAD	NA
Location:	Safety Switch Backing Material; Seat Level							
14	SSB-1-B	7	----	----	----	----	NAD	NA
Location:	Safety Switch Backing Material; Seat Level							
15	TR-1-A	8	----	----	----	----	Chrysotile 22.2	NA
Location:	Transite Electrical Panel; 1st Floor							
16	TR-1-B	8	----	----	----	----	NA/PS	NA
Location:	Transite Electrical Panel; 1st Floor							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
17	DB-1-A	9	----	----	----	----	Chrysotile 50.0	NA
Location:	Debris On The Floor Pipe Insulation; Basement							
18	DB-1-B	9	----	----	----	----	NA/PS	NA
Location:	Debris On The Floor Pipe Insulation; Basement							
19	FLEX-1-A	10	----	----	----	----	NAD	NA
Location:	Vibration Damper Cloth; Basement							
20	FLEX-1-B	10	----	----	----	----	NAD	NA
Location:	Vibration Damper Cloth; Basement							
21	MPJ-1-A	11	----	----	----	----	Chrysotile 44.4	NA
Location:	Mud Pack Pipe Joint Attached With Old Fiberglass Pipe Insulation; Center Restroom On South Side- Basement							
22	FJF-1-A	12	0.172	90.1	3.5	4.9	Chrysotile 1.5	NA
Location:	Floor Joint Fill Material; Exterior- West Side By Building Wall							
23	FJF-1-B	12	0.382	75.9	3.9	20.2	NA/PS	NA
Location:	Floor Joint Fill Material; Exterior- West Side By Building Wall							
24	WPG-1-A	13	1.298	34.9	9.2	48.7	Chrysotile 7.2	NA
Location:	Wooden Wall Panel Glue; 2nd Floor							
25	WPG-1-B	13	0.565	32.2	27.4	40.4	NA/PS	NA
Location:	Wooden Wall Panel Glue; 2nd Floor							
26	WGL-1-A	14	0.425	52.5	2.1	45.4	NAD	NAD
Location:	Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine							
27	WGL-1-B	14	0.432	53.7	1.9	44.4	NAD	NAD
Location:	Glue Attached With Cork Wall Tiles; 1st Floor Mezzanine							
28	MG-1-A	15	0.504	25.2	16.5	55.1	Chrysotile 3.2	NA
Location:	Mastic Attached With Mirrors On The Wall; 2nd Floor							
29	MG-1-B	15	0.361	27.4	17.2	55.4	NA/PS	NA
Location:	Mastic Attached With Mirrors On The Wall; 2nd Floor							
30	IDC-1-A	16	0.795	27.2	22.8	44.0	Chrysotile 3.0	NA
Location:	Interior Door Caulking; Basement						Anthophyllite 3.0	
31	IDC-1-B	16	0.507	28.8	22.1	49.1	NA/PS	NA
Location:	Interior Door Caulking; Basement							
32	DC-1-A	17	0.451	53.4	9.1	35.1	Chrysotile 2.4	NA
Location:	Door Caulking; Exterior						Anthophyllite <1	

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
33	DC-1-B	17	0.803	38.1	10.6	51.3	NA/PS	NA
Location:	Door Caulking; Exterior							
34	WC-1-A	18	0.198	41.9	15.2	39.5	Chrysotile 1.7	NA
Location:	Window Caulking; Exterior						Anthophyllite 1.7	
35	WC-1-B	18	0.484	39.3	12.0	48.8	NA/PS	NA
Location:	Window Caulking; Exterior							
36L1	BBM-1-A	19	0.364	40.9	31.6	27.5	NAD	NAD
Location:	Covebase; Basement- Mezzanine							
36L2	BBM-1-A	19	0.416	30.3	69.5	0.2	NAD	NAD
Location:	Covebase Mastic; Basement- Mezzanine							
37L1	BBM-1-B	19	0.482	42.3	31.7	25.9	NAD	NAD
Location:	Covebase; Basement- Mezzanine							
37L2	BBM-1-B	19	0.435	31.0	68.0	0.9	NAD	NAD
Location:	Covebase Mastic; Basement- Mezzanine							
38L1	BBM-2-A	20	0.363	37.2	51.0	11.8	NAD	NAD
Location:	6" Black Covebase; 2nd Floor							
38L2	BBM-2-A	20	0.312	28.8	70.8	0.3	NAD	NAD
Location:	6" Black Covebase Mastic; 2nd Floor							
39L1	BBM-2-B	20	0.559	38.3	32.4	29.3	NAD	NAD
Location:	6" Black Covebase; 2nd Floor							
39L2	BBM-2-B	20	0.344	27.3	72.1	0.6	NAD	NAD
Location:	6" Black Covebase Mastic; 2nd Floor							
40	FC-1-A	21	0.747	71.8	9.1	19.1	NAD	NAD
Location:	Black Linoleum Floor Covering; Basement Mezzanine							
41	FC-1-B	21	0.668	71.1	10.9	18.0	NAD	NAD
Location:	Black Linoleum Floor Covering; Basement Mezzanine							
42	FC-2-A	22	0.719	72.9	10.8	16.3	NAD	NAD
Location:	Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine							
43	FC-2-B	22	0.669	72.9	10.9	16.1	NAD	NAD
Location:	Brown Linoleum Floor Covering; Middle Stair Room Basement Mezzanine							
44	FT-1-A	23	0.239	20.1	58.2	17.8	Chrysotile 4.0	NA
Location:	9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
45	FT-1-B	23	0.604	20.9	47.5	31.6	NA/PS	NA
Location:	9" Sq. Beige Floor Tiles/ No Mastic; Basement- North Side							
46L1	FT-2A	24	0.999	11.5	87.6	0.9	NAD	NAD
Location:	L1: 12" Sq. White Floor Tile; Basement- Mezzanine							
46L2	FT-2A	24	0.067	22.4	76.1	1.5	NAD	NAD
Location:	L1: 12" Sq. White Floor Tile Mastic; Basement- Mezzanine							
46L3	FT-2A	24	0.327	21.7	71.9	6.4	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tile; Basement- Mezzanine							
46L4	FT-2A	24	0.393	25.7	68.7	5.6	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tile Mastic; Basement- Mezzanine							
47L1	FT-2-B	24	0.621	11.0	87.3	1.8	NAD	NAD
Location:	L1: 12" Sq. White Floor Tiles; Basement- Mezzanine							
47L2	FT-2-B	24	0.112	22.3	75.0	2.7	NAD	NAD
Location:	L1: 12" Sq. White Floor Tiles Mastic; Basement- Mezzanine							
47L3	FT-2-B	24	0.667	22.6	73.9	3.4	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tiles; Basement- Mezzanine							
47L4	FT-2-B	24	0.213	39.9	54.5	5.6	NAD	NAD
Location:	L2: 12" Sq. Beige Floor Tiles Mastic; Basement- Mezzanine							
48L1	FT-2-C	24	0.549	21.1	71.9	6.9	NAD	NAD
Location:	12" Sq. Beige Floor Tiles - Only 1 Layer; Basement- Mezzanine							
48L2	FT-2-C	24	0.270	65.6	27.4	7.0	NAD	NAD
Location:	12" Sq. Beige Floor Tiles Mastic- Only 1 Layer; Basement- Mezzanine							
49L1	FT-3-A		0.337	27.6	30.9	41.5	Chrysotile 6.9	NA
Location:	Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2							
49L2	FT-3-A	25	0.167	80.8	8.4	10.8	NAD	NAD
Location:	Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2							
50L1	FT-3-B		0.414	28.7	27.1	44.2	NA	NA
Location:	Black Floor Tiles; Basement- Mezzanine Under Plywood & FT-2							
50L2	FT-3-B	25	0.214	81.8	8.4	7.8	Chrysotile <0.25	Chrysotile 2.0
Location:	Black Floor Tile Mastic/ Felt Paper; Basement- Mezzanine Under Plywood & FT-2							
51L1	FT-4-A	26	1.003	26.3	44.7	23.5	Chrysotile 5.5	NA
Location:	12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
51L2	FT-4-A	26	0.215	54.4	26.0	19.5	NAD	NAD
Location:	12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine							
52L1	FT-4-B	26	0.590	26.8	44.7	28.5	NA/PS	NA
Location:	12" Sq. Tan Wood Design Floor Tiles; 1st Floor- Mezzanine							
52L2	FT-4-B	26	0.177	58.8	21.5	19.8	NAD	NAD
Location:	12" Sq. Tan Wood Design Floor Tiles Mastic; 1st Floor- Mezzanine							
53L1	FT-5-A	27	0.562	23.7	47.0	25.7	Chrysotile 3.7	NA/PS
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor							
53L2	FT-5-A	27	0.059	39.0	33.9	21.7	NAD	Chrysotile 5.4
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor							
54L1	FT-5-B	27	0.266	24.4	54.5	21.1	NA/PS	NA/PS
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT; 2nd Floor							
54L2	FT-5-B	27	0.086	50.0	20.9	29.1	NAD	NA/PS
Location:	12" Sq. Terra Cotta Red With Brown Spackles FT Mastic; 2nd Floor							
55L1	FT-6-A	28	0.617	24.8	63.7	11.4	NAD	Chrysotile Trace
Location:	12" Sq. Dark Brown Floor Tile; 2nd Floor							
55L2	FT-6-A	28	0.167	62.3	18.0	19.6	NAD	Chrysotile <1.0
Location:	12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor							
56L1	FT-6-B	28	0.586	24.1	64.7	11.3	NAD	NAD
Location:	12" Sq. Dark Brown Floor Tile; 2nd Floor							
56L2	FT-6-B	28	0.063	57.1	30.2	12.7	NAD	NAD
Location:	12" Sq. Dark Brown Floor Tile Mastic; 2nd Floor							
57	MA-1-A	29	0.093	63.4	26.9	8.2	NAD	Chrysotile 1.5
Location:	Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine							
58	MA-1-B	29	0.105	50.5	24.8	24.8	NAD	NA/PS
Location:	Mastic Attached With 9" Sq. Red Floor Tiles (No FT); Middle Stair Room Basement- Mezzanine							
59	MA-2-A	30	0.197	84.8	4.6	10.6	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor							
60	MA-2-B	30	0.451	84.0	4.2	11.7	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Brown Floor Tiles; 1st Floor							
61	MA-3-A	31	0.291	91.4	5.8	2.6	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor							

See Reporting notes on last page

Table I
Summary of Bulk Asbestos Analysis Results
5815101; Kingsbridge Armory; 29 West Kingsbridge Road, Bronx, New York

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
62	MA-3-B	31	0.212	93.4	4.7	1.8	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Black Floor Tiles; 1st Floor							
63	MA-4-A	32	0.166	84.3	4.2	11.3	NAD	Chrysotile Trace
Location:	Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor							
64	MA-4-B	32	0.140	85.0	4.3	10.7	NAD	NAD
Location:	Mastic/ Felt Paper Attached With 9" Sq. Blue Floor Tiles; 1st Floor							
65	MA-5-A	33	0.059	84.7	8.5	5.1	NAD	Chrysotile 1.7
Location:	Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine							
66	MA-5-B	33	0.138	88.4	7.2	4.3	NAD	NA/PS
Location:	Mastic Attached With 9" Sq. Wood Design Floor Tiles; 1st Floor- Mezzanine							

Analyzed by: Aleksandr Barengolts; Date Analyzed 9/15/2008

**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by EPA 600/M4-82-020 per 40 CFR or ELAP 198.1 for New York friable samples or ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (not covered by NVLAP Bulk accreditation); or ELAP 198.4 for New York samples; NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = <1%; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses); AIHA Lab # 102843, NVLAP Lab Code 200546-0, NYSDOH ELAP LAB ID 11480.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogenous materials).

Reviewed By:

Langan
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CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Kingsbridge Armory	Project. No.:	5815101
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel
Site Location:	Bronx, New York	Phone No:	(201) 794-6900
Sampled By:	M. Baran/S. Patel	License #:	103281
Company:	LANGAN		72hrs TAT

ANALYSIS REQUESTED: Asbestos: **XX** Lead:
BULK: **XX**

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
PYB-1-A	pyro-bloeks	1st Floor	9/4,5 &8/08	X				
PYB-1-B	↓	↓	↓	X				
BG-1-A	Boiler Gasket	Boiler room in sub basement		X	20809238 3 -			
BG-1-B	↓	↓		X				
BEP-1-A	Boiler edge Patch materials			X				
BEP-1-B	↓	↓		X				
PB-1-A	Pressboard material	Basement		X				
PB-1-B	↓	↓		X				
WI-1-A	Wire wrap insulation	seating area		X				
WI-1-B	↓	↓	↓	X				

Total No. of Samples: 10
Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

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1617 JFK Boulevard, Ste 889
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555 Long Wharf Drive
New Haven, CT 06511-6107
Phone: 203-562-5771
Fax: 203-789-6142

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
EB-1-A	Electric panel board	Basement	9/4,5 &8/08	X				
EB-1-B	↓	↓	↓	X				
SSB-1-A	Safety switch backing material	seat level		X	20809283-			
SSB-1-B	↓	↓	↓	X				
TR-1-A	Transite electrical panel	1st Floor		X				
TR-1-B	↓	↓	↓	X				
DB-1-A	Debris on the floor Pipe insulation	Basement		X				
DB-1-B	↓	↓	↓	X				
FLEX-1-A	Vibration damper cloth	Basement		X				
FLEX-1-B	↓	↓	↓	X				

Total No. of Samples: 10

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

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Project Name:	Kingsbridge Armory	Project. No.:	5815101
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel
Site Location:	Bronx, New York	Phone No:	(201) 794-6900
Sampled By:	M. Baran/S. Patel	License #:	103281
Company:	LANGAN		72hrs TAT

Sample ID Number	Description of Sample	Location	Sampling Date	ANALYSIS REQUESTED: Asbestos: XX BULK: XX PLM	PLM-NOB	TEM	AAS	Lead: TCLP
					208092383-			
MPJ-1-A	Mudpack pipe joint attached with old fiberglass pipe insulation	Center restroom on southside - Basement	9/4,5 &8/08	X				
FJF-1-A	Floor joint fill material	Exterior - Westside by building wall		X	X	X		
FJF-1-B	↓	↓		X	X	X		
WPG-1-A	Wooden wall panel glue	2nd floor			X	X		
WPG-1-B	↓	↓			X	X		
WGL-1-A	Glue attached with cork wall tiles	1st Floor Mezza-nine			X	X		
WGL-1-B	↓	↓			X	X		
MG-1-A	Mastic attached with mirrors on the wall	2nd Floor			X	X		
MG-1-B	↓	↓			X	X		
/	/	/						

Total No. of Samples: 09

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	
Company: LANGAN		Company: 1057

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

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Phone: 203-562-5771
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				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
IDC-1-A	Interior door caulking	Basement	9/4,5 &8/08		X	X		
IDC-1-B	↓	↓	↓		X	X		
DC-1-A	Door Caulking	Exterior			X	X		
DC-1-B	↓	↓			X	X		
WC-1-A	Window Caulking				X	X		
WC-1-B	↓	↓			X	X		
BBM-1-A	Cove base and mastic	Basement - Mezzanine			X	X		
BBM-1-B	↓	↓			X	X		
BBM-2-A	6" black cove base and mastic	2nd floor			X	X		
BBM-2-B	↓	↓	↓		X	X		

2080923833

Total No. of Samples: 10

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

☒ River Drive Center I
Elmwood Park, NJ 07407
Phone: 201-794-6900
Fax: 201-794-7501

☐ 90 West Street
New York, NY 10006-1039
Phone: 212-964-7888
Fax: 212-964-7885

☐ Georgetown Crossing
3655 Route 202, Ste 225
Doylestown, PA 8901-1699
Phone: 215-348-7101
Fax: 215-348-7125

☐ 1 Penn Center & Suburban Stn
1617 JFK Boulevard, Ste 889
Philadelphia, PA 19103
Phone: 215-864-0640
Fax: 215-864-0671

☐ Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511-6107
Phone: 203-562-5771
Fax: 203-789-6142

				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
FC-1-A	Black linoleum floor covering	Basement Mezzanine	9/4,5 &8/08		X	X		
FC-1-B	↓	↓	↓		X	X		
FC-2-A	Brown linoleum floor covering	Middle stair room Basement Mezzaine	↓		X	X		
FC-2-A	↓	↓	↓		X	X		
FT-1-A	9"sq. Beige floor tiles/ NO mastic	Basement - North side	↓		X	X		
FT-1-B	↓	↓	↓		X	X		
FT-2-A	L1: 12"sq. white floor tiles and mastic	Basement - Mezzanine	↓		X	X		
	L2: 12"sq. beige floor tiles and mastic	↓	↓		X	X		
FT-2-B	↓	↓	↓		X	X		
FT-2-C	12"sq. beige floor tiles and mastic - Only 1 layer	↓	↓		X	X		

2080923833

Total No. of Samples: 09

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12 1037
Fedex Delivery	TIME:	
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

☒ River Drive Center I
Elmwood Park, NJ 07407
Phone: 201-794-6900
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☐ 90 West Street
New York, NY 10006-1039
Phone: 212-964-7888
Fax: 212-964-7885

☐ Georgetown Crossing
3655 Route 202, Ste 225
Doylestown, PA 8901-1699
Phone: 215-348-7101
Fax: 215-348-7125

☐ 1 Penn Center & Suburban Stn
1617 JFK Boulevard, Ste 889
Philadelphia, PA 19103
Phone: 215-864-0640
Fax: 215-864-0671

☐ Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511-6107
Phone: 203-562-5771
Fax: 203-789-6142

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

Project Name:	Kingsbridge Armory	Project. No.:	5815101
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel
Site Location:	Bronx, New York	Phone No:	(201) 794-6900
Sampled By:	M. Baran/S. Patel	License #:	103281
Company:	LANGAN		72hrs TAT

Sample ID Number	Description of Sample	Location	Sampling Date	ANALYSIS REQUESTED: Asbestos: XX BULK: XX PLM	PLM-NOB	TEM	Lead: AAS	TCLP
FT-3-A	Black floor tiles and mastic/felt paper	Basement-Mezzanine under Plywood & FT-2	9/4,5 &8/08		X	X		
FT-3-B	↓	↓	↓		X	X		
FT-4-A	12" sq. tan wood design floor tiles and mastic	1st floor-Mezzanine			X	X	2080923	83
FT-4-B	↓	↓			X	X		
FT-5-A	12" sq. terra cotta red with brown speckles FT and mastic	2nd Floor			X	X		
FT-5-B	↓	↓			X	X		
FT-6-A	12" sq. dark brown floor tiles and mastic	2nd Floor			X	X		
FT-6-B	↓	↓			X	X		
MA-1-A	Mastic attached with 9" sq. red floor tiles (No FT)	Middle stair room Basement-Mezzanine			X	X		
MA-1-B	↓	↓	↓		X	X		

Total No. of Samples: 10

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	0937
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan
Engineering and Environmental Services

CHAIN OF CUSTODY RECORD / ANALYSIS REQUEST

☒ River Drive Center I
Elmwood Park, NJ 07407
Phone: 201-794-6900
Fax: 201-794-7501

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3655 Route 202, Ste 225
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Phone: 215-348-7101
Fax: 215-348-7125

☐ 1 Penn Center & Suburban Stn
1617 JFK Boulevard, Ste 889
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Phone: 215-864-0640
Fax: 215-864-0671

☐ Long Wharf Maritime Center
555 Long Wharf Drive
New Haven, CT 06511-6107
Phone: 203-562-5771
Fax: 203-789-6142

				ANALYSIS REQUESTED: Asbestos: XX				Lead:
Project Name:	Kingsbridge Armory	Project. No.:	5815101	BULK: XX				
Address:	29 West Kingsbridge Road	Auth. By:	Vijay Patel					
Site Location:	Bronx, New York	Phone No:	(201) 794-6900	PLM	PLM-NOB	TEM	AAS	TCLP
Sampled By:	M. Baran/S. Patel	License #:	103281					
Company:	LANGAN		72hrs TAT					

Sample ID Number	Description of Sample	Location	Sampling Date	PLM	PLM-NOB	TEM	AAS	TCLP
MA-2-A	Mastic/Felt paper attached with 9" sq. brown floor tiles,	1st Floor	9/4,5 &8/08		X	X		
MA-2-B	↓	↓	↓		X	X		
MA-3-A	Mastic/Felt paper attached with 9"sq. black floor tiles	1st Floor			X	X		
MA-3-B	↓	↓	↓		X	X		
MA-4-A	Mastic/Felt attached with 9"sq. blue floor tiles	1st Floor			X	X		
MA-4-B	↓	↓	↓		X	X		
MA-5-A	Mastic attached with 9"sq. wood design floor tiles	1st Floor-Mezzanine			X	X		
MA-5-B	↓	↓	↓		X	X		

2080923837

Total No. of Samples: 08

Laboratory Instructions/Turnaround Requested: 72hrs TAT

XXX Stop at first positive result for each homogeneous sample; Analyze by layer

Relinquished By: Sanjay Patel	DATE:	Received By:
Sanjay Patel	9/11/08	9/12
Fedex Delivery	TIME:	1037
Company: LANGAN		Company:

Relinquished By:	DATE:	Received By:
	TIME:	
Company: LANGAN		Company:

Laboratory Name & Address: **AmeriSci, NY**

Langan Certifications/ Laboratory Accreditations

LANGAN

NEW YORK STATE - DEPARTMENT OF LABOR
DIVISION OF SAFETY AND HEALTH
LICENSE AND CERTIFICATE UNIT
STATE CAMPUS BUILDING 12
ALBANY, NY 12240

ASBESTOS HANDLING LICENSE

Langan Engineering And Environmental Services, Inc.
River Drive Center One
619 River Drive
Elmwood Park, NJ 07407

FILE NUMBER: 99-0273
LICENSE NUMBER: 29702
LICENSE CLASS: RESTRICTED
DATE OF ISSUE: 06/10/2008
EXPIRATION DATE: 06/30/2009

Duly Authorized Representative – Vijay Patel

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Maureen A. Cox, Director
FOR THE COMMISSIONER OF LABOR

SH 432 (4-07)

United States Environmental Protection Agency

This is to certify that

Langan Engineering & Environmental Services, Inc.

619 River Drive Center 1, Elmwood Park, New Jersey 07407

has fulfilled the requirements of the Toxic Substances Control Act (TSCA) Section 402(a)(1), and has received certification to conduct lead-based paint activities pursuant to 40 CFR Part 745.226.

In the Jurisdiction of:

New York

This certification is valid from the date of issuance and expires May 30, 2009

NY-2233-1

Certification #

JUN - 5 2006

Issued On

Kenneth S. Stoller

Kenneth S. Stoller, P.E., QEP, DEE, Chief

Pesticides & Toxic Substances Branch

TSC
providing TOTAL SAFETY CONSULTING
5 Court Square
Long Island City, NY 11101
718.389.2103 - Fax: 718.389.6155
www.totalsafety.org



NYC DOB 4-HR Supported Scaffold User Certificate

Name: Vijay Patel
Director: Tom Ferrante **Class Date: 06/19/2007**

Exp. Date: 06/19/2011 **Card No. SS07-2653**

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



VIJAY B PATEL
CLASS(EXPIRES)
C ATEC(05/08) D INSP(05/08)
E MGPL(05/08) H PM (05/08)
I PD (05/08)

CERT# 98-12523

MUST BE CARRIED ON ASBESTOS PROJECTS

NYC DEP Asbestos Control Program
Asbestos Certificate



PATEL,
VIJAY B
INVESTIGATOR
103029
EXPIRES: 5/13/2008

Must be carried on all asbestos projects

NYC DEP Asbestos Control Program
Asbestos Certificate



PATEL,
VIJAY B
INVESTIGATOR
110337
EXPIRES: 5/13/2010
DOB: [redacted] M 5' 06"

Must be carried on all asbestos projects

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



VIJAY B PATEL
CLASS(EXPIRES)
C ATEC(05/09) D INSP(05/09)
E MGPL(05/09) H PM (05/09)
I PD (05/09)

CERT# 98-12523
DMV# [redacted]

MUST BE CARRIED ON ASBESTOS PROJECTS

New York
PROJECT DESIGNER



Certified Lead-Based
Paint Professional

Certification No NY-P-2789-1	
Date of Birth	Expiration Date 09/29/2009
Address	
Badge Holder's Name Vijay B. Patel	
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
US EPA
1200 Pennsylvania Ave, NW
(MC-74040T)
Washington, DC 20460
or call 1-800-424-LEAD

New York
RISK ASSESSOR



Certified Lead-Based
Paint Professional

Certification No NY-R-2789-1	
Date of Birth	Expiration Date 09/29/2009
Address	
Badge Holder's Name Vijay B. Patel	
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
US EPA
1200 Pennsylvania Ave, NW
(MC-74040T)
Washington, DC 20460
or call 1-800-424-LEAD

EYES BLK
HAIR BLK

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 290A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

New York
RISK ASSESSOR



Certified Lead-Based
Paint Professional

New York
INSPECTOR



Certified Lead-Based
Paint Professional

New Jersey Department of
Health & Senior Services
Indoor Environments Program
Lead Certification Permit



SANJAY B PATEL
Permit Number: 017721
ID Number: 006046
Expiration Date: 3/28/2009



Authorization Signature: James A. Buonadies, Director

Inspector/Risk Assessor

NJ Department of Community Affairs
Division of Codes and Standards
Bureau of Code Services



This is to certify that

Sanjay Patel

has been certified as:
Asbestos Safety Technician

Certification #	**01110**
Effective Date	**8/1/2007**
Expiration Date	**7/31/2009**

TSC
providing TOTAL SAFETY CONSULTING
5 Court Square
Long Island City, NY 11101
718.389.2103 - Fax: 718.389.6155
www.totalsafety.org



NYC DOB 4-HR Supported Scaffold User Certificate

Name: Sanjay Patel
Director: Tom Ferrante **Class Date: 06/19/2007**

Exp. Date: 06/19/2011 **Card No. SS07-2672**

NYC DEP Asbestos Control Program
Asbestos Certificate



PATEL,
SANJAYKUMAR B
INVESTIGATOR
108041
EXPIRES: 9/18/2009

Must be carried on all asbestos projects

Certification No NY-I-4643-1	
Date of Birth	Expiration Date 11/20/2009
Address	
Badge Holder's Name	Sanjay B Patel
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
US EPA
1200 Pennsylvania Ave, NW
(MC-7404OT)
Washington, DC 20460
or call 1-800-424-LEAD

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



SANJAYKUMAR PATEL
CLASS(EXPIRES)
C ATEC(09/08) D INSP(09/08)
H PM (09/08)

CERT# 98-10216

MUST BE CARRIED ON ASBESTOS PROJECTS

THIS CARD IS ISSUEDPURSUANT TO
N.J.S.A. 52:27D-119 ET SEQ OF THE
STATE OF NEW JERSEY

CHIEF
BUREAU OF CODE SERVICES

Certification No NY-R-4643-1	
Date of Birth	Expiration Date 11/20/2009
Address	
Badge Holder's Name	Sanjay B Patel
Badge Holder's Signature	

If found, drop in any mailbox
Postmaster: Please return to:
US EPA
1200 Pennsylvania Ave, NW
(MC-7404OT)
Washington, DC 20460
or call 1-800-424-LEAD

This card in no way certifies or verifies this individuals competency in the safe operation of scaffolds

If found, please contact TSC at (718) 389-2103

EYES BLK
HAIR BLK

IF FOUND RETURN TO:
NYSDOL - L&C UNIT
ROOM 290A BUILDING 12
STATE OFFICE CAMPUS
ALBANY NY 12240

This certificate must be shown to a NYCDEP representative upon request. Report loss immediately to NYCDEP Asbestos Control Program, 8th floor 59-17 Junction Blvd., Flushing, NY 11373

This PERMIT has been issued in accordance with N.J.A.C. 8:62. You MUST have this PERMIT with you on the job. To report a lost or stolen permit, notify us of edits to information on a permit, report change of address, report defects in card, or to find out how to renew a permit, contact the NJDHSS at:
New Jersey Department of Health & Senior Services
Consumer & Environmental Health Services
Indoor Environments Program, Training and Certification
3635 Quakerbridge Road, PO Box 372
Trenton, NJ 08625-0372
Telephone: (609) 631-6749 Fax: (609)588-7618
www.state.nj.us/health/eoh/leadasb/
If this permit is found abandoned, please send to above address.

DA 5/14/2007

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200546-0

AmeriSci New York

New York, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

BULK ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2008-07-01 through 2009-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

AmeriSci New York
DBA: AmeriSci New York
117 E. 30th Street
New York, NY 10016
Mr. Paul Mucha
Phone: 212-679-8600 Fax: 212-679-2711
E-Mail: pmucha@amerisci.com
URL: http://www.amerisci.com

BULK ASBESTOS FIBER ANALYSIS (PLM) **NVLAP LAB CODE 200546-0**

NVLAP Code	*Designation / Description*
18/A01	EPA-600/M4-82-020: Interim Method for the Determination of Asbestos in Bulk Insulation Samples

2008-07-01 through 2009-06-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

United States Department of Commerce
National Institute of Standards and Technology

NVLAP®

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200546-0

AmeriSci New York

New York, NY

is accredited by the National Voluntary Laboratory Accreditation Program for specific services, listed on the Scope of Accreditation, for:

AIRBORNE ASBESTOS FIBER ANALYSIS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).

2008-07-01 through 2009-06-30

Effective dates

DEPARTMENT OF COMMERCE * UNITED STATES OF AMERICA *

Sally S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2006-09-13)

National Voluntary Laboratory Accreditation Program

SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

AmeriSci New York
DBA: AmeriSci New York
117 E. 30th Street
New York, NY 10016
Mr. Paul Mucha
Phone: 212-679-8600 Fax: 212-679-2711
E-Mail: pmucha@amerisci.com
URL: http://www.amerisci.com

AIRBORNE ASBESTOS FIBER ANALYSIS (TEM) **NVLAP LAB CODE 200546-0**

NVLAP Code	*Designation / Description*
18/A02	U.S. EPA's "Interim Transmission Electron Microscopy Analytical Methods-Mandatory and Nonmandatory-and Mandatory Section to Determine Completion of Response Actions" as found in 40 CFR, Part 763, Subpart E, Appendix A.

2008-07-01 through 2009-06-30
Effective dates

Sally S. Bruce
For the National Institute of Standards and Technology

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
RICHARD F. DAINES, M.D.

Expires 12:01 AM April 01, 2009
Issued April 01, 2008

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

MR. PAUL MUCHA
AMERICA SCIENCE TEAM NEW YORK INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480
EPA Lab Code: NY01378

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES POTABLE WATER
All approved subcategories and/or analytes are listed below:

Drinking Water Miscellaneous

Asbestos	EPA 100.1
	EPA 100.2

Serial No.: 36239

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify laboratory's accreditation status.

NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER
RICHARD F. DAINES, M.D.

Expires 12:01 AM April 01, 2009
Issued April 01, 2008

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AMERICA SCIENCE TEAM NEW YORK INC
117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480
EPA Lab Code: NY01378

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:

Miscellaneous

Asbestos in Friable Material	EPA 600/M4/82/020
	Item 198.1 of Manual
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	ITEM 198.4 OF MANUAL

Serial No.: 36240

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WADSWORTH CENTER
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117 EAST 30TH ST
NEW YORK, NY 10016

NY Lab Id No: 11480
EPA Lab Code: NY01378

is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES AIR AND EMISSIONS
All approved subcategories and/or analytes are listed below:

Miscellaneous Air

Asbestos	40 CFR 763 APX A No. III
	YAMATE,AGARWAL GIBB
Fibers	NIOSH 7400 A RULES

Serial No.: 36241

Property of the New York State Department of Health. Valid only at the address shown. Must be conspicuously posted. Valid certificates have a raised seal. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify laboratory's accreditation status.

A P P E N D I X D

Copy of the August 24, 2000 Environmental Investigation Report prepared by ET Environmental Corporation

ETENVIRONMENTAL
CORPORATION

KINGSBRIDGE ARMORY ROOF REHABILITATION PROJECT
ENVIRONMENTAL SURVEY REPORT



Kingsbridge Armory Roof
29 West Kingsbridge Road
Bronx, New York

Date Prepared: September 15, 2000

Prepared for:
New York City Economic Development Corporation
110 William Street
New York, NY 10038

Prepared by:
ET Environmental Corporation
3424 Peachtree Road
Suite 200
Atlanta, GA 30326

Written by:
George Pineda, ET
Piotr Chmielinski, HPE
Fred Burkhardt, ATC

This report is submitted the 15th day of September in the Year 2000 by:

George Pineda, CIH, CHMM

Piotr Chmielinski, M.S., CIH

KINGSBRIDGE ARMORY ROOF REHABILITATION PROJECT

ENCLOSED DOCUMENTATION:

1. Environmental Survey Executive Summary
2. Summary Scope of Work
3. Asbestos Survey Report and Removal Specifications
4. Lead Survey Report and Removal Specifications
5. Survey of Biological Contamination

Attachment(s):

A. Environmental Survey Report Prepared By ATC

EXECUTIVE SUMMARY

Environmental testing was conducted to determine if any hazardous building materials will be impacted by roofing work scheduled at the Kingsbridge Armory. Specifically, the roof area was investigated for the presence of asbestos, lead-based paint and bird droppings. This Environmental Survey reports the following findings which may impact construction activities in the roof area of the Kingsbridge Armory:

- Built-up roofing, two-tab shingle and underlayment and caulking were identified as Category 1 non-friable asbestos-containing materials.
- Pipe insulation on the Drill Floor Mezzanine was identified as friable asbestos-containing material.
- Painted surfaces throughout the building contain regulated levels of lead-based paint.
- Bird droppings are present on the roof trusses

Removal/management of these materials is necessary in order to minimize worker exposures and prevent release of hazardous materials into the environment. Abatement plans, which outline procedures for handling these hazardous materials, are incorporated in the enclosed documentation.

The information enclosed is limited in scope to accessible areas of the roof and other areas that may be impacted by roof renovation. Any new materials encountered during the renovation process should be appropriately tested prior to disturbance.

Summary Scope of Work

Asbestos

A. Remove and dispose of all layers of built-up roofing including underlayment, mastics, flashings and adhesives to the deck from the South and North Shed Roofs.

B. Remove and dispose of all layers of two tab shingle roofing including underlayment, mastics, flashings and adhesives to the deck from the South and North Vault Roofs.

C. Remove and dispose of all layers of EPDM, rigid insulation and built-up roofing including underlayment, mastics, flashings and adhesives to the deck from the low slope administrative building roof, parapet band and one story structures located on the roof.

D. Remove and dispose of all exposed and concealed mastics, flashing material, adhesives and caulking from the East and West gable ends.

E. Remove and dispose of all exposed and concealed mastics, flashing material, adhesives and caulking from the North and South clerestory bands.

F. Remove and dispose of all exposed and concealed caulking from the parapet wall.

G. Remove and dispose of perimeter pipe insulation on the drill floor mezzanine level to facilitate roof abatement.

H. Removal and disposal of accumulated debris on drill floor as asbestos contaminated waste prior to commencement of scaffolding work and throughout roof abatement work.

I. Removal and disposal of accumulated roofing debris surrounding the armory building prior to commencement of abatement work and throughout roof abatement work.

Demolition

A. Remove and dispose of existing roof decking from the South and North shed and vault roofs. If contaminated with roofing material dispose of as asbestos containing waste.

B. Remove metal panels from the East and West gable ends to access mastics, flashing material, adhesives and caulking. If metal panels are contaminated with mastics, flashing materials, adhesives or caulking decontaminate or dispose of as asbestos containing waste.

C. Remove corrugated and metal panels from the North and South clerestory bands to access mastics, flashing material, adhesives and caulking. If corrugated or metal panels are contaminated with mastics, flashing materials, adhesives or caulking decontaminate or dispose of as asbestos containing waste.

Avian Fecal Contamination

A. Remove any significant deposits of bird droppings.

B. Place all waste in 6 mil poly bags.

C. Dispose of waste as normal construction debris.

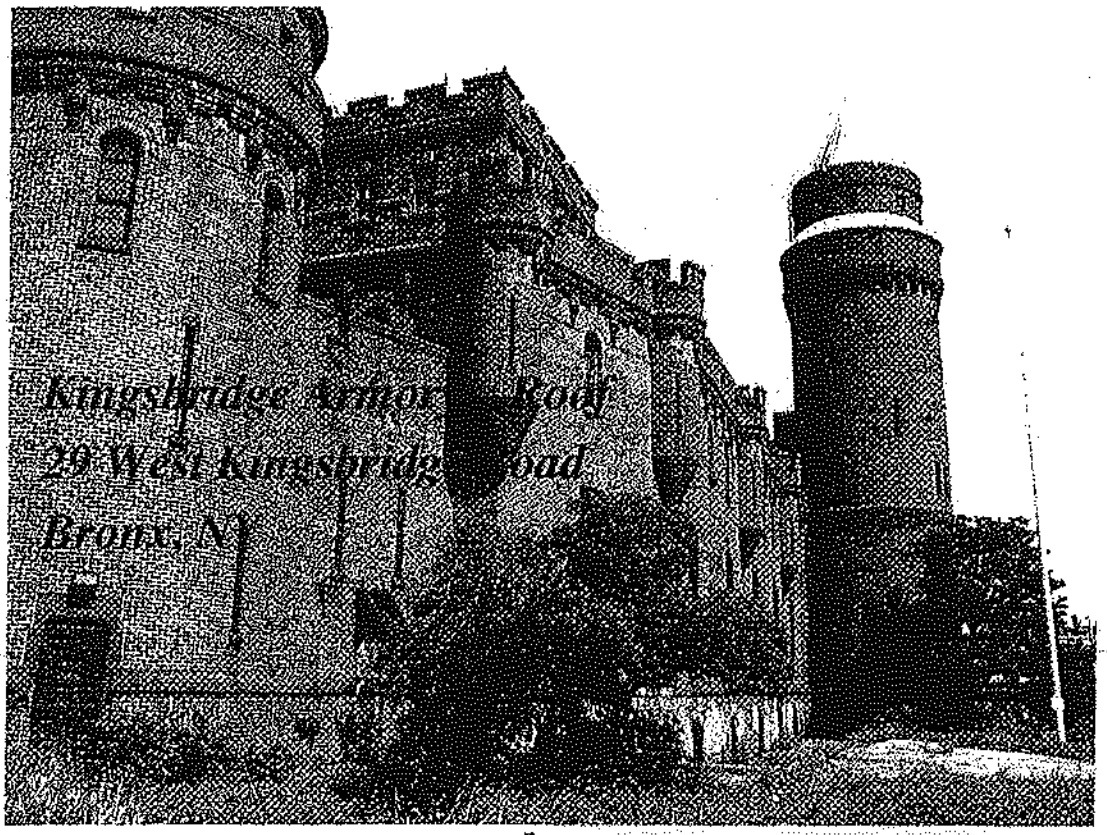
Load Paint Abatement/Surface Preparation

A. Remove all coatings and debris from the top cord of roof trusses and angle brackets exposed by removal of the roof decking.

B. Coatings removal shall meet SSPC Specifications SP-11-87T for Power Tool Cleaning to Bare Metal. It is the intent to remove all coatings and debris from these surfaces to facilitate other trades' work on these surfaces during this project.

ETENVIRONMENTAL
CORPORATION

KINGSBRIDGE ARMORY ROOF REHABILITATION PROJECT
Asbestos Survey Report (Summary) And Removal Specifications



Date Prepared: *September 15, 2000*

Prepared for: *New York City Economic Development Corporation*
110 William Street
New York, NY 10038

Prepared by: *ET Environmental Corporation*
3424 Peachtree Road
Suite 200
Atlanta, GA 30326

Written by: *George Pineda, CIH, CHMM*
Piotr Chmielinski, M.S., CIH

REPORT SUMMARY

Testing was conducted to determine if asbestos is present in the roofing material of a building planned for renovation, located at 29 West Kingsbridge Road in Bronx, New York. The survey and collection of samples was conducted in August, 2000. This report concludes that non-friable asbestos containing materials are present on the roof.

Chrysotile asbestos (Category 1 non-friable) was identified in:

South Shed Roof	Built-up roofing, wood decking* (Black, ~64,800 sf)
North Shed Roof	Built-up roofing, wood decking (Black, ~64,800 sf)
South Vault Roof	Two-tab shingle and underlayment, wood decking (Black, ~41,300 sf)
North Vault Roof	Two-tab shingle and underlayment, wood decking (Black, ~41,300 sf)
Low slope – Administrative Wing	Two-tab shingle and underlayment, wood decking (Black, ~41,300 sf)
East Metal Gable End	Caulking (Black, ~3,500 sf)
West Metal Gable End	Caulking (Black, ~3,500 sf)
South Clerestory Band	Caulking (Black, ~2,500 sf)
North Clerestory Band	Caulking (Black, ~2,500 sf)
Parapet Wall	Caulking (Black, ~1,400 sf)

NOTE: Quantities are an estimation only. If used for abatement purposes, the contractor should confirm these amounts.

** if contaminated by ACM*

This report is submitted the 8th day of September in the Year 2000 by:

George Pineda, CIH, CHMM

Piotr Chmielinski, M.S., CIH

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Introduction

Project Description

The property located at 29 West Kingsbridge Road was surveyed at the request of the New York City Economic Development Corporation. The building is located in Bronx, New York.

The building is a 900,000 square foot building previously used as an armory.

In August, 2000, Mr. James Ruchalski (New York Certificate # AH 91-06714) and Mr. Jay Dupay (New York Certificate # AN 88-05963) of ATC Associates, Inc. (ATC) inspected the above mentioned structure and collected a total of 29 representative samples of different suspect building materials on the roof. Inspection and collection of samples included accessing all roof areas and collecting samples of any roofing materials that were suspected to contain asbestos.

Bulk sampling was conducted utilizing techniques of destructive methods (a complete review of survey limitations is provided under Bulk Sampling Collection).

Objective of Survey

The goal of the survey was to determine if any materials on the roof contain asbestos. This information is required to comply with current State of New York and City of New York asbestos regulations prior to the renovation of this structure.

Current Regulatory Guidelines

OSHA: Meets criteria for OSHA medical records rule. 29 CFR 1910.20 (7/1/88)

OSHA: 8 hr Time Weighted avg.: 0.1 fiber/cc. A fiber is defined as a particulate form of asbestos, tremolite, anthophyllite, or actinolite, 5 µm or longer, with a length-to-diameter ratio of at least 3:1. 29 CFR 1910.1001 (8/10/94)

NIOSH: 8-hr TWA: .1 fiber/cc (fibers greater than 5 µm in length) NIOSH. NIOSH POCKET GUIDE CHEM HAZ 2ND PRT 1987 Appendix D

ACGIH: TLV - Time Weighted Avg. (TWA) 0.2 fiber/cc (fibers longer than 5 µm and with an aspect ratio equal to or greater than 3:1) (1980) ACGIH. TLVs 1989-90., p. 12

EPA: Asbestos has been designated as a hazardous air pollutant under section 112 of the Clean Air Act. 40 CFR 61.01 (7/1/88)

Miscellaneous Published Reports

NTIS: Industrial Health Hazards Due to Atmospheric Factors, April 1982-May 1983.

USEPA/ECAO: Asbestos Health Update (1984) EPA 600/8-84-003A

WHO: Environ Health Criteria: Asbestos and Other Natural Mineral Fibers (1986)

USEPA: Health and Environmental Effects Profile for Asbestos (1979)

Survey and Analytical Methods

Air Sample Collection

No air samples were collected during this inspection.

Bulk Sample Collection

Samples of building material were collected using metal sampling devices. Material collected was contained entirely within catch containers and emissions from sampling were contained by application of wetting agents when appropriate.

Bulk sampling was conducted utilizing standard techniques. Efforts were made not to impair the function or appearance of items sampled. In some instances, samples could not be taken without adversely impacting the intended function of the material

Sample Analysis

Analysis of bulk building material for the presence of asbestos, was conducted using the current NIOSH 7403 method. The technique includes use of polarized light microscopy with confirmation technique using dispersion staining. This method is designed to identify asbestos minerals and determine their estimated concentrations as a percent by weight. Ref: NIOSH. MANUAL ANALYT METH 3RD ED VOLS 1,2 SUPPLS 1984. V1 7403-1.

The United States Environmental Protection Agency (USEPA) defines ACM as a material which contains greater than 1% (w/w) of asbestos. Thus, materials that contain asbestos in concentrations greater than 1% are frequently labeled "positive" while materials containing less than 1% are labeled "negative". Although this convention has gained general acceptance, the designation was arbitrarily determined and may be subject to revision in the future. Precedent for such a revision can be found in the redefinition of "ACM" by the USEPA to include non-friable materials.

In some cases limitations associated with the analytical method must also be considered when determining what is a "positive" result. For instance, when asbestos fibers are contained within a vinyl matrix of a floor tile, the analysis requires that the vinyl be dissolved in organic solvents. In this case it is difficult to assign an accurate percentage to the asbestos content of the floor tile and labeling this floor tile as "negative", when it contains less than 1% asbestos, may be inappropriate and misleading. Likewise, some flooring materials are formulated using very fine asbestos fibers. At some point these very fine fibers become invisible to light microscopy techniques. Experience has demonstrated that reports of trace quantities of asbestos in some flooring materials following examination by light microscopy may be inaccurate. Frequently flooring materials are found to contain significantly more asbestos when analyzed by other techniques such as electron microscopy.

For these reasons, the "positive" designation in this report will be applied to materials when even trace quantities of asbestos are detected. This will remain the case unless additional testing or other information is available to confirm the concentration of asbestos to be less than or equal to 1%.

Results

The laboratory report listing the results for all twenty-nine (29) samples collected from the roof area is included in Attachment A to this survey report. Asbestos was identified in twenty-two (22) of the samples.

Results Summary

The on-site inspection and subsequent review of laboratory results of the 29 bulk samples collected during the survey in August, 2000 found that

- Chrysotile asbestos (Category 1 non-friable) was identified in the built-up roofing located on the North and South Shed Roofs.
- Chrysotile asbestos (Category 1 non-friable) was identified in the two tab shingle and underlayment located on the North Vault Roof.
- Chrysotile asbestos (Category 1 non-friable) was identified in the window mastic (see Photograph 4) located on the East and West Gable Ends, North and South Clerestory Bands and Parapet Wall.

Conclusions and Recommendations

The findings of this survey include Category 1 non-friable roofing material and caulking.

Due to the planned renovation of the building, the State of New York and City of New York require any asbestos-containing materials (i.e. roofing material and pipe insulation) that will be disturbed during renovation to be removed prior to renovation. All asbestos removal work must be performed by a qualified asbestos abatement contractor.

NOTE: While care has been taken to locate and sample all suspect materials associated with the structures, the potential does exist for additional materials to be concealed within the structures (i.e. behind framing, under roofing, etc.). For this reason, during the renovation process, care should be taken to recognize any materials that may become evident and accessible. Additional testing and/or removal of the materials may be required.

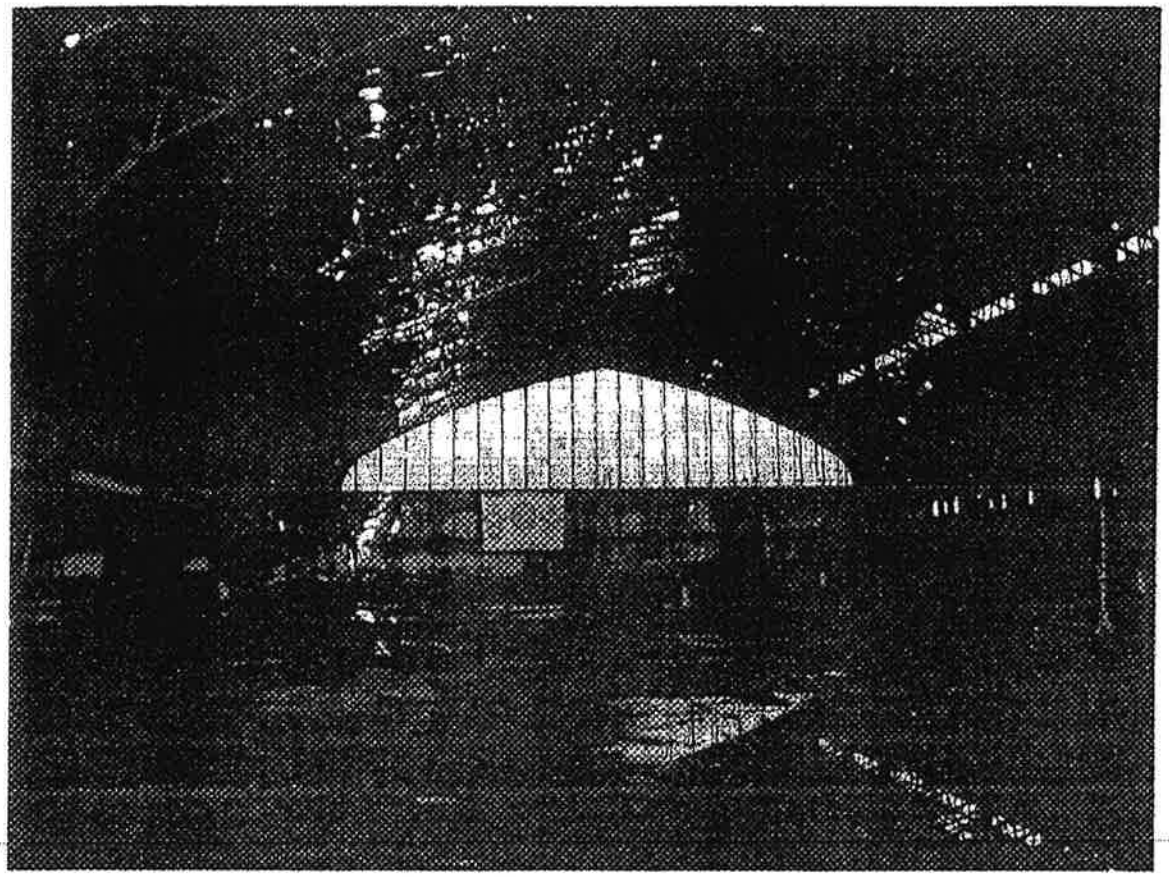
If renovation is not scheduled for the near future in building areas not included in the roof rehabilitation phase, the building owner should implement the following:

1. Control access to the area where the asbestos containing materials are located. This controlled access should include restricting workers and repair activities in the area to those persons who have been notified that some building materials contain asbestos.
2. Use work practices and/or other controls as necessary to inhibit the release or spread of asbestos fibers from the ACM. These work practices should include instructions not to cut, drill, sand or disturb the ACM matrix in any manner that may cause the release of asbestos fibers from the material.



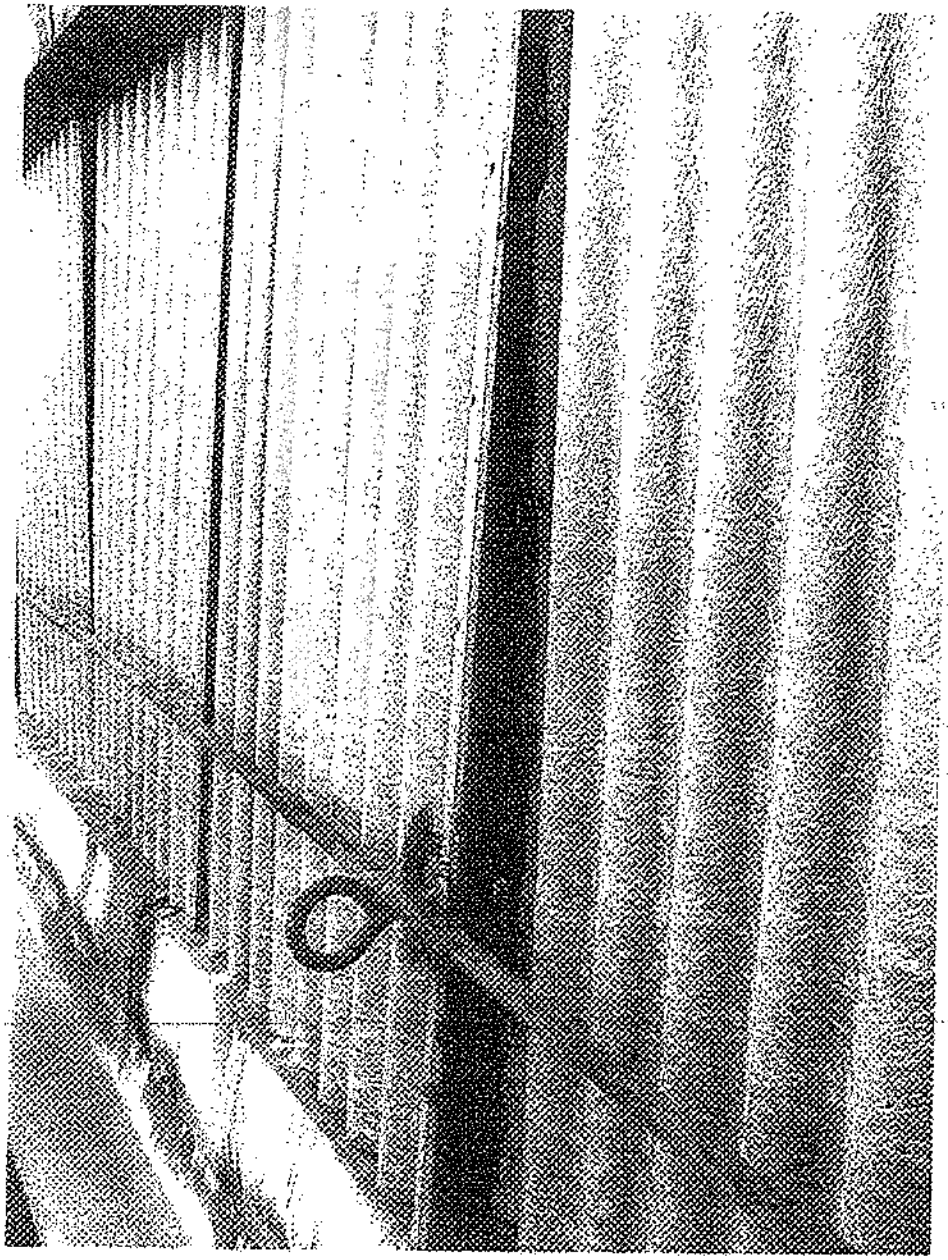
Photograph 1

The Kingsbridge Armory. View of the south side from 29 West Kingsbridge Road.



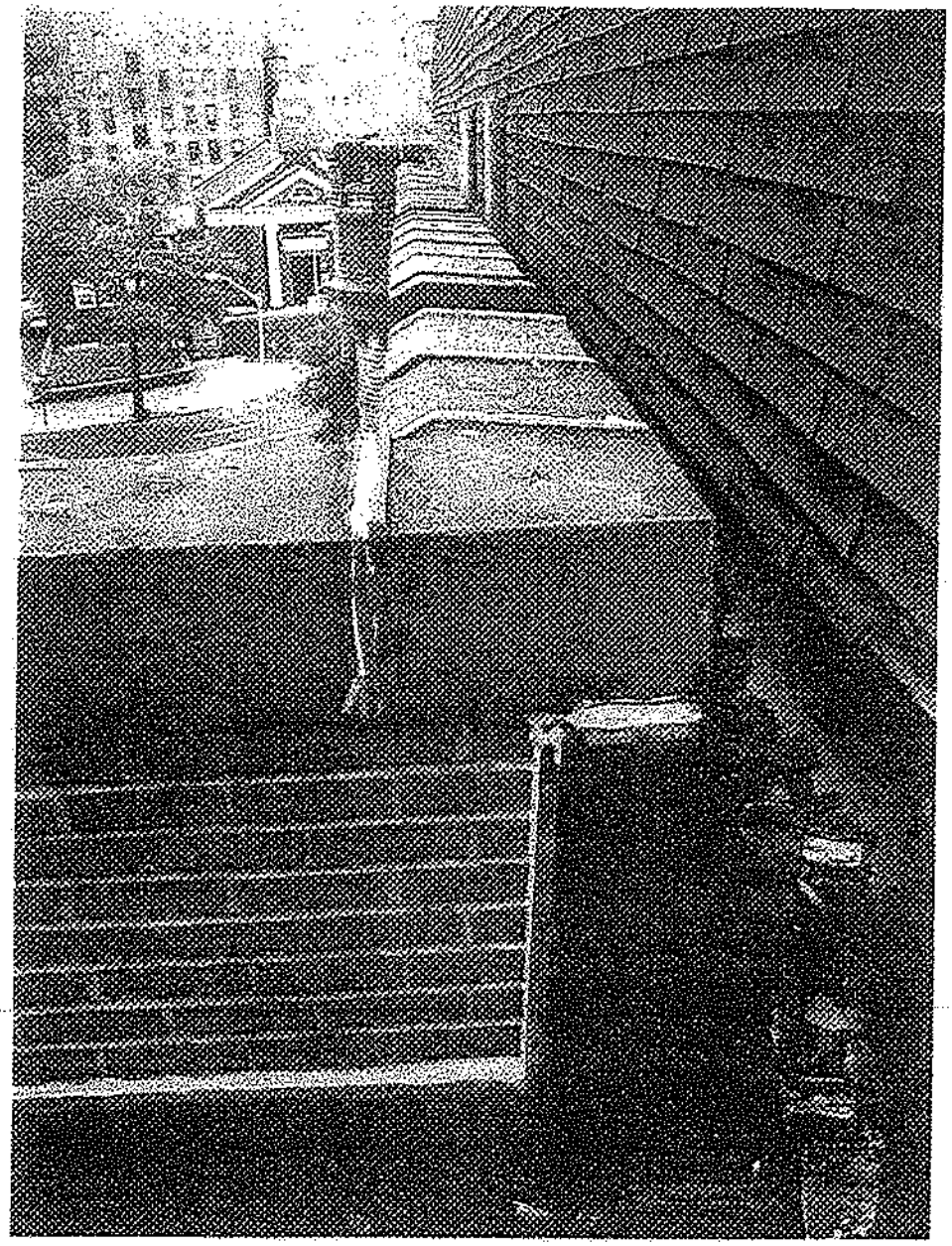
Photograph 2

View of the interior (drill floor) facing south. Removal of ACM pipe insulation and cleaning of ACM debris from the floor will be part of roof work.



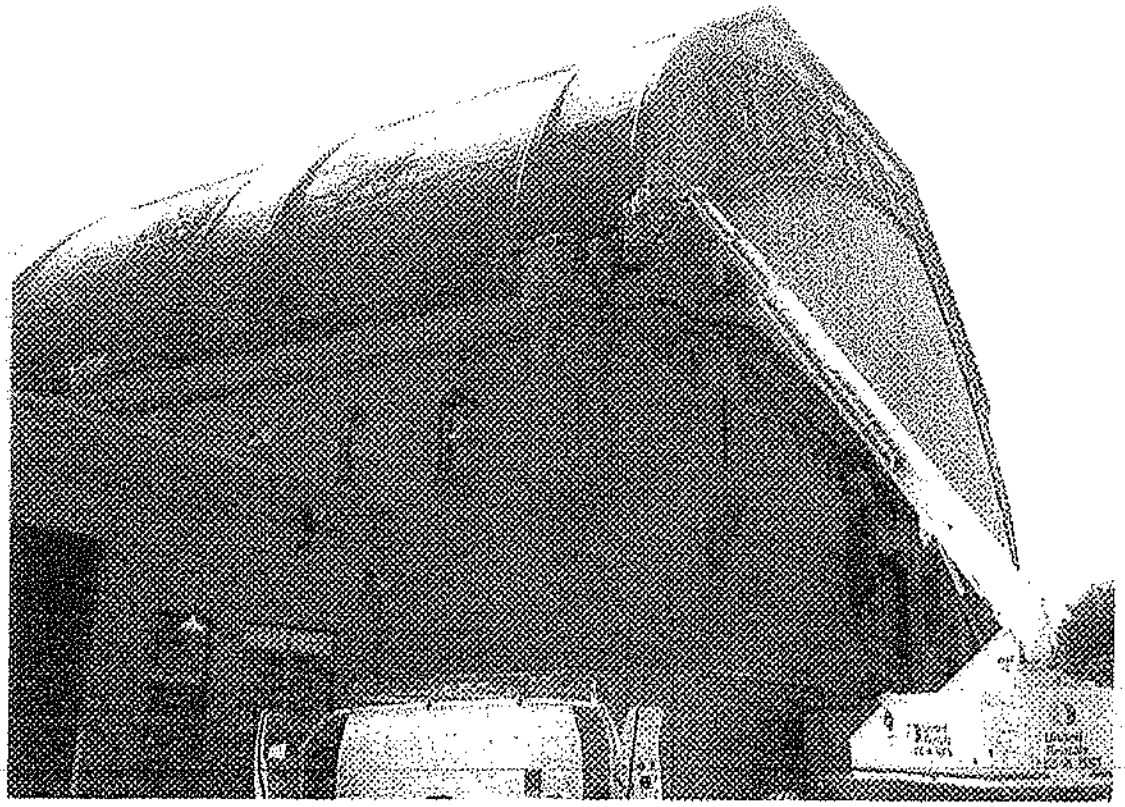
Photograph 4

View of corrugated boards with ACM mastic/coating.



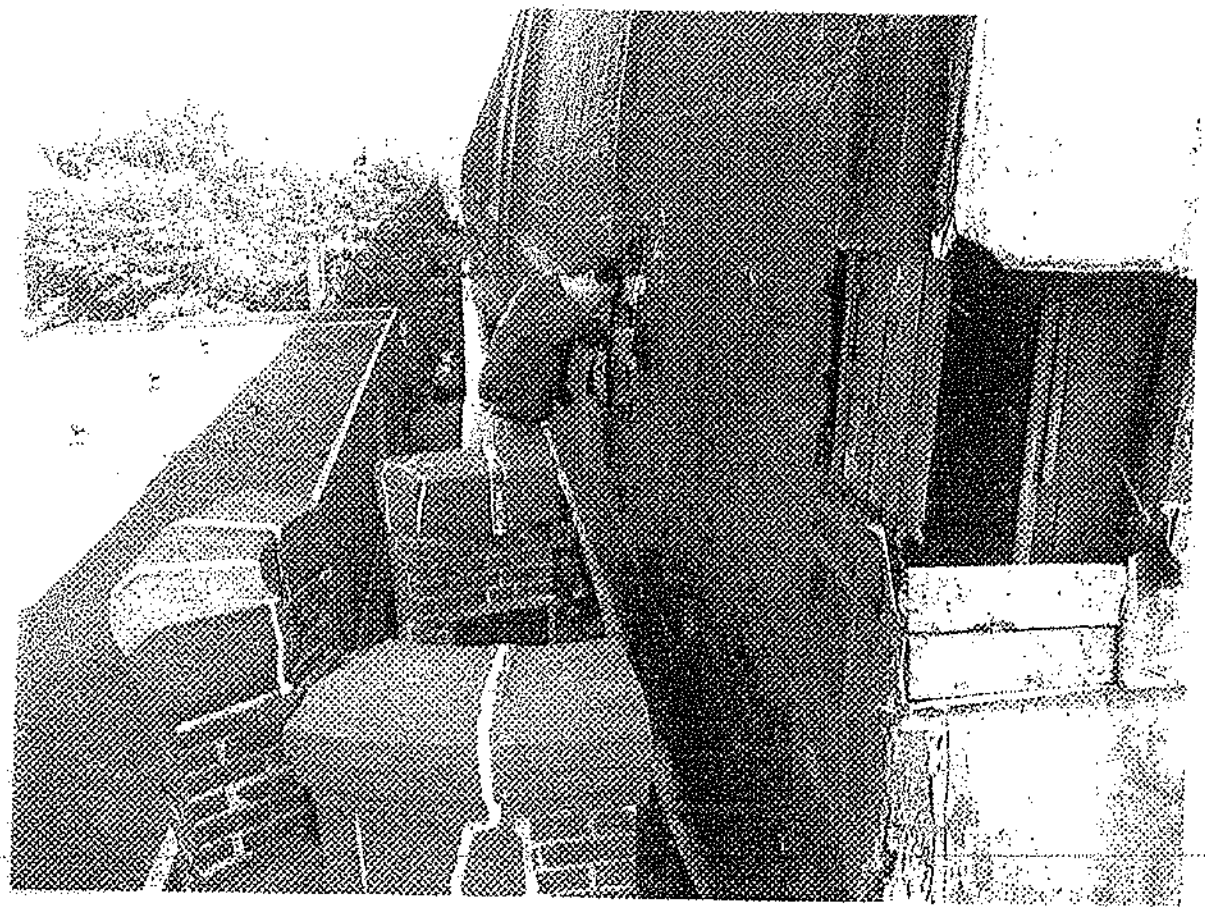
Photograph 5

View of the southwest parapet. With the exception of parapet ACM caulkings (white and black), all ACM roofing materials must be removed during the roofing phase of the project.



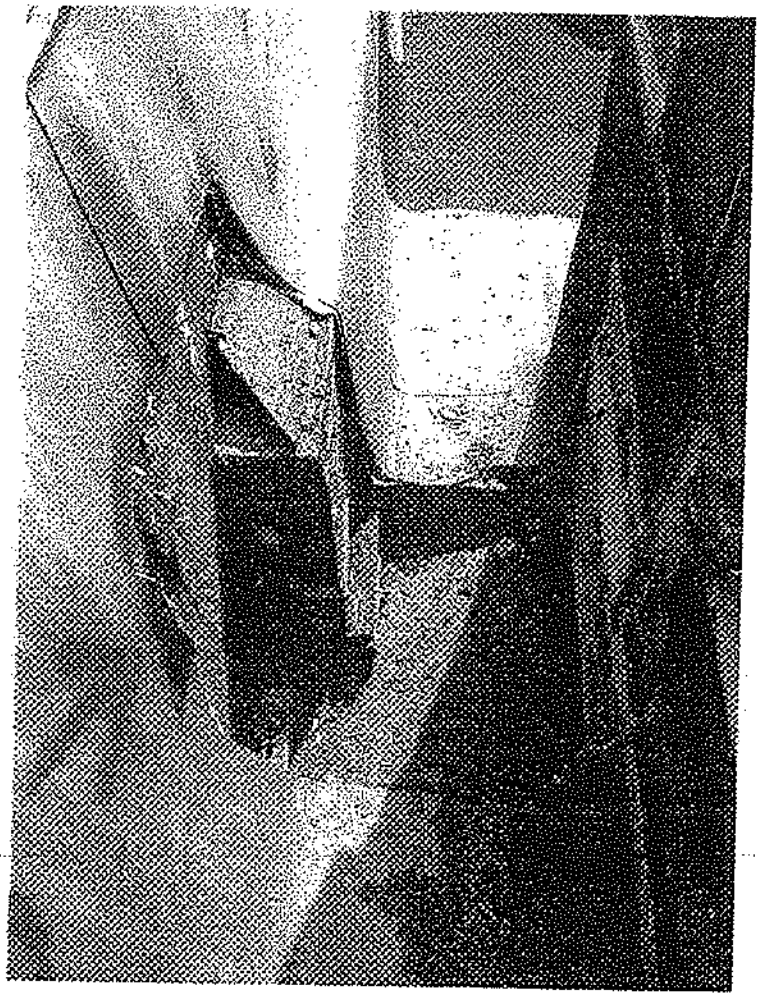
Photograph 6

View of the northwest roof.



Photograph 7

View of the northwest corner of the roof.



Photograph 8

View of the west side parapet.

Appendix A

ASBESTOS REMOVAL SPECIFICATIONS

ASBESTOS REMOVAL SPECIFICATIONS

PART 1 GENERAL

1.01 SCOPE OF WORK

A. This asbestos abatement Project will consist of the removal and disposal of all asbestos containing roofing, contaminated decking, caulking, miscellaneous adhesives and pipe insulation materials from the areas identified below at the Kingsbridge Armory, Bronx, NY.

B. The work shall include but not be limited to the removal of following asbestos-containing materials (ACM):

Location:	ACM	Quantity
South Shed Roof	Built-up roofing, wood decking[1]	64,800 SF
North Shed Roof	Built-up roofing, wood decking	64,800 SF
South Vault Roof	Two-tab Shingle and underlayment, wood decking	41,300 SF
North Vault Roof	Two-tab Shingle and underlayment, wood decking	41,300 SF
Low slope – Administrative Wing	EPDM & Rigid Insulation over built-up roofing	20,000 SF
East Metal Gable End	Caulking[2]	3,500 SF
West Metal Gable End	Caulking[2]	3,500 SF
South Clerestory Band	Caulking[2]	2,500 SF
North Clerestory Band	Caulking[2]	2,500 SF
Parapet Wall	Caulking[2]	1,400 LF
Drill Floor Mezzanine	Pipe Insulation	1,500 LF
Drill Floor	Debris[3]	180,000 sf
Exterior (around building perimeter)	Roofing debris	N/A

[1] If wood decking is contaminated by ACM.

[2] Approximate square footage of surfaces impacted by the caulking.

ETENVIRONMENTAL
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KINGSBRIDGE ARMORY ROOF REHABILITATION PROJECT
ATTACHMENT A
ENVIRONMENTAL SURVEY REPORT PREPARED BY ATC



Kingsbridge Armory Roof
29 West Kingsbridge Road
Bronx, New York

Asbestos Survey

A Joint Venture of Turner Construction Company and EMCON

Asbestos Report

Environmental Survey of:	KINGSBRIDGE ARMORY 29 WEST KINGSBRIDGE ROAD BRONX, NY 10468
Prepared for:	ET ENVIRONMENTAL CORPORATION 3424 Peachtree Road, NE Suite 200 Atlanta, GA 30326
Prepared by:	ATC ASSOCIATES INC. 104 East 25th Street, 10th Fl. New York, New York 10010
ATC Project #:	75018-0001
Report Date:	August 24, 2000

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VATC ASSOCIATES INC.
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EXECUTIVE SUMMARY

ATC Associates Inc. was contracted by ET Environmental Corp. to conduct a survey of the Kingsbridge Armory 29 West Kingsbridge Road, Bronx, NY. The intent was to identify asbestos containing materials, lead containing and/or lead based paints and coatings, mercury-containing switches or lamps, suspect PCB (polychlorinated biphenyls) or DEHP (Di (2-ethylhexyl) phathatlate) containing light ballasts, storage tanks and stored or abandoned materials at the facility.

The survey identified an estimated fourteen thousand two hundred sixty (14,260) feet of thermal system insulation (piping, cementitious joints), thirty-three thousand six hundred sixty (33,660) square feet of flooring materials (floor tiles, linoleum) and two-hundred thirty-five thousand (235,000) square feet of roofing materials (2-tab shingles, built-up roofing, mastics). Additionally, glazing associated with the windows (interior and exterior) and caulking material associated with windows and exterior joints, seams and cracks was identified as asbestos containing materials. Plaster surfaces primarily walls and ceilings were tested throughout the armory and were determined to **not** be an asbestos containing material.

The survey confirmed lead at detectable levels and above for each substrate as follows; 59% of brick, 45% concrete, 73% metal, 89% plaster and 56% wood. Substrates were distinguished by and identified by the exposed coating color. However, variance of lead results within a single testing combination particularly gray painted concrete substrate indicate that the lead-containing layer(s) occur below the exposed common layer. Therefore, the generally poor condition of painted surfaces combined with the inability to distinguish painted components by the exposed color all paint should be considered lead containing for purposes of OSHA compliance, waste stream management and environmental dust control.

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No mercury containing switches were observed. Ballasts inspected at various locations of the Armory were found to be not labeled as to content or in poor condition, therefore all ballasts were considered PCB or DEHP containing. An estimated six hundred fifty (650) light fixtures, one thousand two hundred fifty (1,250) bulbs/tubes, seven hundred (700) ballasts and one hundred nine (109)metal halide lights were observed. All PCB/DEHP-contaminated materials should be incinerated, mercury containing lighting lamps, such as: Fluorescent, Mercury Vapor, and High Intensity Discharge lamps (including Metal Halide lamps, High Pressure Sodium lamps, and Low Pressure Sodium lamps) should be disposed through a complete recycling process.

The visual inspection of the Armory grounds indicated that at least four underground storage tanks existed at one time as determined by identified vent pipes and fill ports. Regulatory database review identified five underground storage tanks and two aboveground storage tanks associated with the Armory. An electro-magnetic survey of suspect areas indicated that two buried tanks might exist in the garage parking area. Presumably, these could be the closed tanks identified as tank 1 –diesel and tank 2- unleaded gasoline. Additionally, the survey identified seven additional aboveground 275-gallon storage tanks in the basement not identified in the regulatory database. Tanks 1 and 2 appear to have been closed and abandoned in place, which can be verified by test pits. Additional investigation is required to ascertain the disposition of tanks 3 through 7. The seven aboveground storage tanks identified by the survey need to be examined/tested for product type, content and eventual disposition.

Throughout the Armory, various paints, solvents and maintenance products were observed that would require consolidation and disposal. Abandoned refrigeration/air conditioner units may contain CFC compounds and require reclamation prior to disposal. Several animal/bird carcasses and small quantities of avian excreta were observed in localized areas, disturbance of these items would require personal protective equipment.

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INTRODUCTION

ATC Associates Inc. was contracted by ET Environmental Corp. to conduct a survey of the Kingsbridge Armory 29 West Kingsbridge Road, Bronx, NY. The intent was to identify asbestos containing materials, lead containing and/or lead based paints and coatings, mercury containing switches or lamps, suspect PCB (polychlorinated biphenyls) or DEHP (Di (2-ethylhexyl) phathatlate) containing light ballasts, storage tanks and stored or abandoned materials at the Kingsbridge Armory.

Messrs James Ruchalski and Jay Dupay of ATC performed the asbestos survey. Mr. Dupay holds certifications from the New York City Department of Environmental Protection as an Asbestos Investigator and the New York State Department of Labor as an Asbestos Inspector and will be the inspector of record for all filings. Mr. Ruchalski holds certification from the New York State Department of Labor as an Asbestos Inspector. Mr. Richard Edwards and Maraina Medinets performed the XRF survey. The survey was performed from July 24 through August 22, 2000.

STANDARDS OF CARE

ATC Associates Inc.'s work was performed in a professional manner with the best interest of our client in mind. Our objective was to perform our work with care, exercising the customary skills and competence of consulting professionals in the relevant disciplines. The conclusions presented in this report are professional opinions based upon visual observations of the site and laboratory results from samples collected and analyzed.

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The opinions and recommendations presented herein apply to site conditions existing at the time of our observations. ATC Associates Inc. cannot act as insurers, and no expressed or implied representation or warrant is included or intended in our report except that our work was performed, within the limits prescribed by our clients, with the customary thoroughness and competence of our profession at the time and place the services were rendered. This report is designed to generally identify the accessible recognized environmental materials identified in the introduction at the facility.

ASBESTOS – SURVEY

Guidelines used for the survey were established by the Environmental Protection Agency (EPA) in the Guidance for Controlling Asbestos Containing Materials in Buildings, Office of Pesticides and Toxic Substances, Doc 560/5-85-024, and 40 CFR Part 763, Asbestos Hazard Emergency Response Act (AHERA).

Field information was organized in accordance with the AHERA methodology of homogenous area (HA). During the survey, reasonable effort was made to identify all locations and types of ACM materials associated with the scope of work. Multiple samples of homogeneous materials were chosen at random. However, due to inconsistencies of a manufacturer's processes and the contractor's installation methods, materials of similar construction may contain various amounts of asbestos. Further, some materials that were not originally specified to contain asbestos may in fact contain this mineral. For example, cementitious pipe insulation and plaster were frequently mixed with asbestos at the construction site for ease of application. Locating all asbestos materials can only be definitively achieved by conducting exploratory demolition and sampling every section of pipe insulation, fitting or valve covering, fireproofing, and other suspect ACM.

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Bulk samples of suspect ACM were analyzed using polarized light microscopy (PLM) coupled with dispersion staining, as described in 40 CFR Part 763 and the National Emissions Standard for Hazardous Air Pollutants (NESHAP). NESHAP is the standard industry protocol for the determination of asbestos in building materials. A suspect material is immersed in a solution of known refractive index and subjected to illumination by polarized light. The color displays that result is compared to a standardized atlas whereby the specific variety of asbestos is determined. It should also be recognized that PLM is primarily a qualitative identification method whereby asbestos percentage, if any, is estimated. While EPA, New York State; and New York City regulations governing ACM consider materials containing greater than 1-percent as asbestos, accurately quantifying asbestos content below 5-percent has been shown to be unreliable. Without additional and more sophisticated analysis, using transmission electron microscopy (TEM), a 1-percent content or less of asbestos in a building material sample may still result in an exposure or possible respiratory hazard should the material be indiscriminately demolished. Therefore, for identification and appropriate asbestos management, ATC recommends that any detected asbestos in a suspect material using PLM be considered asbestos. For those materials revealing no asbestos using PLM, TEM analysis should be conducted for confirmation.

The New York State Department of Health has revised the PLM Stratified Point Counting Method. The new method, "Polarized Light Microscopy Methods for Identifying and Quantifying Asbestos in Bulk Samples" can be found as item 198.1 in the Environmental Laboratory Approval program (ELAP) Certification manual. The method specifies a procedure of analysis for bulk samples that fall into the category of "Non-friable Organically Bound" (NOB). This category includes any sample in a flexible to rigid asphalt or vinyl matrix (floor tiles, mastic, roofing shingles, roofing felt, etc.). Additional materials that may fall into this category are textured paints and stucco, pipe valve and joint packing, and a variety of other applications. These samples must be "ashed" in a muffle furnace at 480-degrees Celsius (to remove organic matrix), treated with acid (to remove any mineral carbonate), and filtered through a 0.4-micron filter before being analyzed by PLM. The sample must be weighted between each of these steps to track the percent loss of organic matrix.

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ELAP has determined that analysis of NOB materials is not reliably performed by PLM. Therefore, if PLM yields results of 1-percent asbestos or less, the result must be confirmed by TEM. Bulk samples that undergo TEM analysis use the sample reduction methodology stated above for NOB analysis by PLM. ELAP certified laboratories must include the following statement with their PLM analysis results for each "inclusive" (1-percent or less asbestos) NOB sample: "Polarized-light microscopy is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound materials. Before this material can be considered or treated as non-ACM, confirmation must be made by quantitative transmission electron microscopy".

Selected samples initially analyzed by Polarized Light Microscopy which yielded a negative PLM result and which are classified as a "non-friable" material, were then re-analyzed utilizing Transmission Electron Microscopy methodology described above. The laboratory performing both these analysis procedures was ATC Associates Inc., located at 104 East 25th Street, New York, New York. The following laboratory accreditation's are included in Appendix C:

- National Voluntary Laboratory Accreditation Program (Lab Code 1187-00)
- New York State Environmental Laboratory Approval Program (Lab No. 10879)
- American Industrial Hygiene Association Accredited Laboratory (Lab No. 7054)

ASBESTOS – SURVEY FINDINGS

Two hundred twenty-five bulk samples were collected from representative homogeneous areas throughout the facility. Tabular summary of bulk samples is located in Appendix A with field data/chain of custody forms in Appendix B. Asbestos sample locations and schematic material drawings are located in Appendix H. Based upon visual inspection of representative materials likely to be impacted by the planned interior demolition and/or renovation and bulk sample laboratory analytical results, the following materials have been identified as **asbestos containing materials [ACM]** (greater than one percent asbestos).

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- 2-tab roof shingle
- Built-up roofing
- Tar paper underlayment
- Roofing mastics/adhesives
- Pitch pockets
- 9" x 9" floor tiles (all colors)
- Sheet linoleum
- Corrugated (aircell) pipe insulation
- Cementitious pipe joint insulation associated with corrugated (aircell) pipe insulation
- magnesia (pre-formed block) pipe insulation
- Cementitious pipe joint insulation associated with magnesia (pre-formed block) pipe insulation
- Cementitious pipe joint insulation associated with fiberglass pipe insulation (National Guard Office only)
- window glazing (interior and exterior)
- Caulking material associated with windows and exterior joints, seams and cracks

Thermal system insulation was identified primarily in exposed readily accessible locations throughout the facility as described below. However, concealed thermal system insulation was observed in interstitial wall spaces associated with bathroom fixtures and the plenum area above suspended plaster ceilings.

Sub-basement	No ACM observed
Basement	TSI located on perimeter steam, hot and cold water lines. Piping in hallways has been abated and replaced with non-ACM insulation.
Basement Mezzanine	TSI located on perimeter steam, hot and cold water lines. TSI located on steam lines parallel to hallway in ammunition storage rooms. Asbestos containing flooring in office areas on southern wall.

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Drill Floor	Perimeter steam and hot and cold water lines. Asbestos containing flooring in office areas along southern wall. Asbestos containing window caulking and glazing on all windows.
Drill Floor Mezzanine	TSI located on steam, hot and cold water lines associated with bathrooms. Asbestos containing flooring in office areas on southern wall.
Second Floor	Perimeter steam and hot and cold water lines. Asbestos containing flooring in office areas along southern wall. Asbestos containing window caulking and glazing on all windows.
Third Floor	Perimeter steam and hot and cold water lines. Asbestos containing flooring in office areas along southern wall. Asbestos containing window caulking and glazing on all windows.
Roofs	Built-up and two tab shingle roofing including underlayment, mastics, flashings and adhesives. Mastics, flashing material, adhesives and caulking on gable ends, clerestory bands and parapets.

The survey identified the following estimated quantities of asbestos containing thermal system insulation (piping, cementitious joints), flooring materials (floor tiles, linoleum) and roofing materials (3-tab shingles, built-up roofing, mastics) within the survey boundaries.

Level	Thermal System Insulation (Linear Feet)	Flooring Material (Square Feet)	Roofing (Square Feet)
Basement	7,410	300	-
Basement Mezzanine	2,275	1,000	-
Drill Floor	3,540	6,460	-
Second Floor	675	17,500	-
Third Floor	210	8,400	-
Fourth Floor	150	-	-
Roofs	-	-	235,000
Totals	**14,260**	**33,660**	**235,000**

A detailed table of asbestos containing materials by area is located in Appendix D.

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Based upon visual inspection of materials determined to be impacted by the renovation program and bulk sample laboratory analytical results, the following materials are identified as **not asbestos containing materials** (less than one- percent asbestos).

- Boiler insulation'
- Breeching insulation
- Gray floor coating – drill floor
- Cementitious pipe joint insulation associated with fiberglass pipe insulation (Main armory building)
- 12" x 12" ceiling tile
- 2' x 2' ceiling tile
- 2' x 4' ceiling tile
- Joint compound
- Wall plaster – brown coat
- Wall plaster – white coat
- Ceiling plaster – brown coat
- Ceiling plaster – white coat
- Brown paper under 3-tab shingle
- Wallboard

LEAD – SURVEY (PAINTED SURFACES)

The objective of this survey was to identify existing lead-based paint on potentially impacted building surfaces during pending renovation/demolition activities. All painted components were not sampled with the XRF; rather, the survey sampled representative painted building substrates and components and based on the results assumptions as to lead content are made in this report. If questions arise as to the lead content in paint found on a specific surface not tested by ATC, additional testing may be required.

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A portable Lead Paint Analyzer manufactured by Radiation Monitoring Devices (RMD) was used to test all accessible painted components. The instrument was operated in accordance with manufacturer's instructions and XRF performance characteristic sheet (PCS). Representative readings were taken from each surface. Three calibration readings were taken before and after testing in the facility to ensure proper instrument operation. XRF results were divided into three categories: positive, inconclusive, and negative as defined by the PCS. According to the revised PCS for the RMD device, inconclusive ranges exist only for metal substrates. If the result was inconclusive, a paint chip sample was collected for laboratory analysis to determine the actual result.

LEAD –SURVEY FINDINGS (PAINTED SURFACES)

One thousand one hundred ninety building surfaces were tested with a portable X-Ray Fluorescence analyzer for lead content. Substrates tested within the Armory were; brick, concrete, metal, plaster, sheetrock, and wood. Substrates were distinguished by and identified by the exposed coating color. Bulk samples collected form the steel arch's on the drill floor confirmed lead content on the arched of between 8.92 and 56.67 %. A tabular summary of XRF survey data and bulk samples is located in Appendix E

Substrate	Shots	Shots >.4	Shots > 1	Percent of components with XRF detectable levels of lead	Percent of components with a Lead based coating
Brick	119	70	67	59%	56%
Concrete	178	80	62	45%	35%
Metal	403	295	238	73%	59%
Plaster	207	184	180	89%	87%
Sheetrock	34	0	0	0%	0%
Wood	249	140	106	56%	43%
Sub-Total	1190	769	653	65%	55%
Calibration	35				
Total	1225				

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LEAD – SURVEY (TARGET RANGES)

Waste classification of the soils/sand identified within the basement rifle and pistol ranges was performed to determine proper handling and storage requirements as well as the disposal location (i.e., either RCRA Subtitle "C" landfill or Construction and Demolition (C&D) Subtitle "D" landfill). Environmental Protection Agency's (EPA) Resource Conservation and Recovery Act (RCRA) mandates that the lead containing media be characterized as either hazardous or non-hazardous waste prior to disposal. The TCLP composite samples were representative of the various materials that constituted the waste stream. The Inspector donned disposable gloves, which were changed prior to the collection of each sample. The material was placed into a ziplock bag, sealed, and labeled with a unique identifier. A minimum of 100 grams of material was collected. A chain of custody form was completed and submitted with the samples to the laboratory.

LEAD – SURVEY FINDINGS (TARGET RANGES)

ATC collected four (4) representative four-point composite samples from the basement shooting ranges. Sample 1 was collected form Pistol Ranges 9 – 16, Sample 2 was collected form Pistol Ranges 1 – 8, Sample 3 was collected from the most recently active portion of the Rifle Ranges, Sample 4 was collected from the abandoned portion of the Rifle Ranges behind the steel back stop. Analytical results indicate that the anticipated waste stream from each of the sampled areas contain levels of leachable lead in excess of RCRA standards. All four samples contained leachable lead above 5ppm.

Sample	Location	Analytical Result)
1	Pistol Range 9 – 16	1,480 ppm
2	Pistol Range 1 – 8	655 ppm
3	Rifle Range (active)	23.9 ppm
4	Rifle Range (abandoned)	5.84 ppm

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Based on TCLP results indicating leachable levels of lead greater than 5 ppm, the waste streams generated by the removal of the soils, sands and other material are characterized as a hazardous lead containing solid waste as defined by RCRA.

FLUORESCENT AND HIGH-INTENSITY DISCHARGE LIGHTING (HID)/BALLASTS

A visual walk-through of the Armory was conducted including examination of typical fixtures to ascertain the approximate quantity of mercury containing switches, lamps and suspect PCB or DEHP containing light ballasts. A drawing identifying approximate room locations and quantities of fixtures, bulbs and ballasts in located in Appendix H. No mercury containing switches were observed. Ballasts inspected at various locations of the Armory were found to be not labeled as to content or in poor condition, therefore all ballasts were considered PCB or DEHP containing. An estimated quantity of light fixtures, bulbs and ballasts is as follows:

Level	FIXTURES	Bulbs/Tubes	Ballasts	Metal Halide Lights
Basement	185	450	300	9
Basement Mezzanine	190	300	145	-
Drill Floor	175	300	145	100
Second Floor	100	200	110	-
Third Floor	-	-	-	-
Fourth Floor	-	-	-	-
Totals	**650**	**1250**	**700**	**109**

The primary concern regarding the disposal of used fluorescent ballasts is the health risk associated with polychlorinated biphenyl's (PCBs). Human exposure to these possible carcinogens can cause skin, liver, and reproductive disorders. Fluorescent and high-intensity discharge (HID) ballasts contain a small capacitor that may contain high concentrations of PCBs (greater than 90% pure PCBs or 900,000 ppm). These chemical compounds were widely used as insulators in electrical equipment such as capacitors, switches, and voltage regulators through the late 1970s.

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The Toxic Substances Control Act (TSCA) was enacted in 1976, and subsequently banned the production of PCBs in the United States. The specific regulations governing the use and disposal of PCBs are found in Volume 40 Code of Federal Regulations (CFR) Part 761.

The proper method for disposing used ballasts depends on several factors, such as the type and condition of the ballasts and the regulations or recommendations in effect in the state(s) where you remove or discard them. TSCA specifies the disposal method for ballasts that are leaking PCBs. In addition, generators of PCB-containing ballast wastes may be subject to notification and liability provisions under the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA) (also known as "Superfund").

Identifying criteria

- All ballasts manufactured through 1979 contain PCBs.
- Ballasts manufactured after 1979 that do not contain PCBs are labeled "No PCBs."
- If a ballast is not labeled "No PCBs," assume it contains PCBs.

DEHP-CONTAINING BALLASTS

Di (2-ethylhexyl) phathatlate (DEHP) is a substance that was used to replace PCBs in certain ballast capacitors beginning in 1979. DEHP in its pure form is listed as a hazardous waste under the Resource Conservation and Recovery Act (RCRA). However, once it has been used in a lighting ballast, it is no longer hazardous as defined by RCRA. (See 40 CFR 261.33, Part 261 Appendix VII, Section 268.34, and Section 268.43.) DEHP is regulated under CERCLA– the Superfund law. The "Reportable Quantity" (RQ) of DEHP under CERCLA is 100 pounds. (See 40 CFR, Section 302.4.) This means that if you are disposing of 100 pounds or more of the material in a 24 hour period (approximately 1,600 fluorescent lighting ballasts), you are required to notify the National Response Center at (800) 424-8802. It also means that parties involved with the disposal of DEHP ballasts may be held liable under Superfund if clean up of the DEHP is required.

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Identifying criteria

- DEHP has been found in ballasts designed for the following lighting fixtures: four foot fluorescent fixtures manufactured between 1979 and 1985
- Eight foot fluorescent fixtures manufactured between 1979 and 1991
- High intensity discharge (HID) fixtures manufactured between 1979 and 1991

MERCURY-CONTAINING LAMPS

Fluorescent and high-intensity discharge (HID) lamps contain a small quantity of mercury that can be harmful to the environment and to human health when improperly managed. Mercury is regulated under RCRA, which is administered by the US Environmental Protection Agency. Under current Federal law, mercury-containing lamps such as fluorescent and HID lamps may be hazardous waste. In addition, incandescent and HID lamps may contain small quantities of lead that can also be potentially harmful to human health and the environment.

STORAGE TANKS

The visual inspection of the Armory grounds indicated that at least four underground storage tanks existed; one underground storage tank (UST) in the western parking area as evidenced by an observed fill port and possible vent line, two UST's associated with the maintenance garage as evidenced by two vent lines and one UST associated with the heating plant of the National Guard Office and garage as evidenced by an observed fill port and vent line. A database search located in Appendix F provided by Environmental Data Resources, Inc. identified five underground storage tanks and two aboveground storage tanks associated with the Armory as follows:

Tank	Product	Capacity (gallons)	Status
1	Diesel	3,000	Closed
2	Unleaded Gasoline	2,000	Closed
3	1,2 or 4 Fuel Oil	2,000	Closed
4	1,2 or 4 Fuel Oil	8,000	Closed
5	Unleaded Gasoline	225	Closed
6	Diesel	225	Unknown
7	Other	275	Unknown

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Additionally, eight additional aboveground 275-gallon storage tanks were identified in the basement southeast hallway opposite the shooting ranges, and not identified in the regulatory database.

Sanborn fire insurance maps for the years 1896, 1900, 1914, 1945, 1950, 1981, 1991, 1992, 1993, 1995 and 1996, and aerial photographs for years 1954, 1966, 1975, 1984 and 1994 provided by Environmental Data Resources, Inc. did not provide any indication of tank locations.

An electro-magnetic of suspect areas was performed by NAEVA (Appendix G) indicated that two buried tanks might exist in the garage parking area. Presumably, these could be the closed tanks identified as tank 1 –diesel and tank 2- unleaded gasoline.

SURVEY LIMITATIONS

No lighting, extensive debris, standing water and microbial growth obscure many areas throughout the facility. These limitations impeded access and restricted viewing of some materials. Access to the upper shed roof and the entire north roof was not possible during this survey.

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CONCLUSIONS AND RECOMMENDATIONS

Asbestos

Asbestos containing materials have been located throughout the Kingsbridge Armory. Asbestos containing materials identified by the survey or revealed by subsequent demolition to be asbestos containing should be removed and disposed of prior to initiation of construction activities. The removal of these materials should be conducted by a State of New York licensed asbestos abatement contractor in accordance with all applicable federal, state, and local regulations. Sufficient sample density exists from the plasters to allow ATC to prepare a New York City Department of Environmental Protection Asbestos Control Program form 5 (Not an Asbestos Project) for demolition of plaster surfaces following abatement of the asbestos containing materials.

Lead - (Painted Surfaces)

All painted surfaces and building components should be assumed to contain lead and be handled in accordance with the requirements of the OSHA Lead Exposure in Construction Standard (29 CFR 1926.62) and any other local requirements. Painted components within the Armory are in generally poor condition throughout and should be considered lead containing for purposes of OSHA compliance, waste stream management and environmental dust control.

This survey does not relieve any renovation/demolition contractors from the responsibility of:

- The Occupational Safety and Health Administration's (OSHA) Construction Industry requirements.
- The Resource Conservation and Recovery Act (RCRA) requirements for testing and disposal of lead-contaminated materials.
- Any other applicable federal, state, or local regulations.

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Lead –(Target Ranges)

All sand including wood dead stop material should be handled and disposed of as lead contaminated material.

PCB/DEHP, Mercury

All PCB/DEHP-contaminated materials should be incinerated pursuant to the U.S. Environmental Protection Agency's PCB Rules 40 CFR Part 761 and relevant state rules and regulations. All mercury containing lighting lamps, such as: Fluorescent, Mercury Vapor, and High Intensity Discharge lamps (including Metal Halide lamps, High Pressure Sodium lamps, and Low Pressure Sodium lamps) should be disposed through a complete recycling process.

Storage Tanks

Tanks 1 and 2 appear to have been closed and abandoned in place, which can be verified by test pits. Additional investigation is required to ascertain the disposition of tanks 3 through 7. The seven aboveground storage tanks identified by the survey need to be examined/tested for product type, content and eventual disposition

MISCELANEOUS

The Kingsbridge Armory is identified as a large quanity generator of hazardous/regulated waste. This registration if inactive should be closed out. Throughout the Armory, various paints, solvents and maintenance products were observed that would require consolidation and disposal. Abandoned refrigeration/air conditioner units may contain CFC compounds and require reclamation prior to disposal. Several animal/bird carcasses and small quantities of avian excreta were observed in localized areas, disturbance of these items would require personal protective equipment.

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APPENDIX A:
SAMPLE ANALYSIS RESULTS IN TABULAR FORM

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	FT1	001	Floor Tile "wood grain"	1	Rm # 1W-6	6% Chrysotile
Armory	FT1	002	Floor Tile "wood grain" 9"x 9"	1	Rm # 1W-6	NA
Armory	FT1	003	Floor Tile "wood grain" 9"x 9"	1	Rm # 1W-6	NA
Armory	MS1	004	Mastic from wood grn ft	1	Rm # 1W-6	INC
Armory	MS1	005	Mastic from wood grn ft	1	Rm # 1W-6	INC
Armory	MS1	006	Mastic from wood grn ft	1	Rm # 1W-6	INC
Armory	FT2	007	Floortile 9"x 9"	1	Rm # 1W-5	18% Chrysotile
Armory	FT2	008	Maroone	1	Rm # 1W-5	NA
Armory	FT2	009	Maroone	1	Rm # 1W-5	NA
Armory	MS2	010	Mastic maroone Floor Tile	1	Rm # 1W-5	INC
Armory	MS2	011	Mastic maroone Floor Tile	1	Rm # 1W-5	INC
Armory	MS2	012	Mastic maroone Floor Tile	1	Rm # 1W-5	INC
Armory	FT3	013	Floor tile brown 9"x 9"	1	Rm # 1E-4	5% Chrysotile
Armory	FT10	014	Floor tile brown 9"x 9"	2	Rm # 2E-3	NA
Armory	FT10	015	Floor tile brown 9"x 9"		Set #1 office	NA
Armory	MS3	016	Mastic Brown - Floor Tile	1	Rm #1E-4	INC
Armory	FT10	017	Floor tile brown 9"x 9"	2	Rm #2E-3	INC
Armory	MS10	018	Mastic brown FT		Set #1 office	INC
Armory	FT4	019	Floor Tile Black 9"x 9"	1	Rm # 1E-1	12% Chrysotile
Armory	FT4	020	Floor Tile Black 9"x 9"	1	Rm # 1E-1	NA
Armory	FT4	021	Floor Tile Black 9"x 9"	1	Rm # 1E-1	NA
Armory	MS4	022	Mastic Black - Floor Tile	1	Rm # 1E-1	INC
Armory	MS4	023	Mastic Black - Floor Tile	1	Rm # 1E-1	INC
Armory	MS4	024	Mastic Black - Floor Tile	1	Rm # 1E-1	INC
Armory	FT5	025	Floor tile - Red 9"x 9"	1	Rm # 1W-4	6% Chrysotile
Armory	FT5	026	Floor tile - Red 9"x 9"	1	Rm # 1W-4	NA
Armory	FT5	027	Floor tile - Red 9"x 9"	1	Rm #1E-2	NA

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	MS5	028	Mastic red	1	Rm # 1W-4	INC
Armory	MS5	029	Mastic red	1	Rm # 1W-4	INC
Armory	MS5	030	Mastic red	1	Rm #1E-2	INC
Armory	FT6	031	Floor tile - blue 9"x 9"	1	Rm # 1W-4	22% Chrysotile
Armory	FT6	032	Floor tile - blue 9"x 9"	1	Rm # 1W-4	NA
Armory	FT6	033	Floor tile - blue 9"x 9"	1	Rm # 1W-4	NA
Armory	MS6	034	Mastic blue - Floor Tile	1	Rm # 1W-4	INC
Armory	MS6	035	Mastic blue - Floor Tile	1	Rm # 1W-4	INC
Armory	MS6	036	Mastic blue - Floor Tile	1	Rm # 1W-4	INC
Shelter		037	Floor tile - white 12" x 12"	BM	Womens Shelter	INC
Shelter		038	Floor tile - white 12" x 12"	BM	Medical Office	INC
Shelter		039	Floor tile - white 12" x 12"	BM	Medical Office	INC
Shelter		040	Mastic white - Floor Tile	BM	Womens shelter medical office	INC
Shelter		041	Mastic white 12" ft	BM	Womens shelter medical office	INC
Shelter		042	Mastic white 12" ft	BM	Womens shelter medical office	INC
Armory	FT7	043	Brown Linoleum	1	Rm #1W-5	2% Chrysotile
Armory	FT11	044	Brown Linoleum	1	Rm #1W-5	NA
Armory	FT7	045	Brown Linoleum	1	Rm #1W-5	NA
Armory	FT8	046	White Linoleum	1	Rm #1W-1	INC
Armory	FT8	047	White Linoleum	1	Rm #1W-1	INC
Armory	FT8	048	White Linoleum	1	Rm #1W-1	INC
Armory	FT9	049	Black Linoleum	1	SWT #2 Upper Office	INC
Armory	FT9	050	Black Linoleum	1	1W - 1	INC
Armory	FT9	051	Black Linoleum	1	SWT #2 Upper Office	INC
Shelter		052	Tan 12" x 12" Floor Tile	BM	Womens Shelter	INC
Shelter		053	Tan 12" x 12" Floor Tile	BM	Hallway	INC
Shelter		054	Tan 12" x 12" Floor Tile	BM	Dorm #	INC

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Shelter		055	Mastic 12"x 12' Floor Tile	BM	Dorm #	INC
Shelter		056	Mastic 12"x 12' Floor Tile	BM	Dorm #	INC
Shelter		057	Mastic 12"x 12' Floor Tile	BM	Dorm #	INC
Shelter		058	Void			VOID
Shelter		059	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		060	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		061	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		062	2'x 2' Ceiling Tile	BM	Womens shelter medical office	NAD
Shelter		063	2'x 4' Ceiling Tile	BM	Womens shelter lounge	NAD
Shelter		064	2'x 4' Ceiling Tile	BM	Womens shelter lounge	NAD
Shelter		065	2'x 4' Ceiling Tile	BM	Womens shelter cafeteria	NAD
Shelter		066	2'x 4' Ceiling Tile	BM	Womens shelter cafeteria	NAD
Shelter		067	Cove Base	BM	Womens shelter cafeteria	INC
Shelter		068	Cove Base	BM	Womens shelter cafeteria	INC
Shelter		069	Cove Base	BM	Womens shelter cafeteria	INC
Shelter		070	Cove Base	BM	Womens shelter cafeteria	INC
Armory	CT1	071	2'x 4' Ceiling Tile	1	Room 1E2	NAD
Armory	CT1	072	2'x 4' Ceiling Tile	1	Room 1E2	NAD
Armory	CT1	073	2'x 4' Ceiling Tile	1	Room 1E2	NAD
Armory	CT2	074	1'x 1' Ceiling Tile	1	Room 1W4	NAD
Armory	CT2	075	1'x 1' Ceiling Tile	1	Debris on floor 1W4	NAD
Armory	CT2	076	1'x 1' Ceiling Tile	1	Debris on floor 1W5	NAD
Shelter		077	Elbow Mud	BM	Womens shelter	NAD
Shelter		078	Elbow Mud	BM	Womens shelter	NAD
Shelter		079	Elbow Mud	BM	Womens shelter	NAD
Armory	TSI1	080	Woven Pipe Wrap	2	Room 2E2	NAD
Armory	TSI1	081	Woven Pipe Wrap	2	Room 2E3	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	TSI1	082	Woven Pipe Wrap	2	Room 2E4	NAD
Armory		083	Woven Pipe Wrap	2	Room 2E5	NAD
Armory	M1	084	Window Glazing	2	Rm. SE-1	INC
Armory	M1	085	Window Glazing	2	Rm. SE-1	INC
Armory	M1	086	Window Glazing	1	Roof Turret	INC
Armory	M2	087	Wallboard	1	RM. SW-5	NAD
Shelter		088	Wallboard	BM	RM. SW-4	NAD
Shelter		089	Wallboard	BM	Shelter	NAD
Armory		090	Wallboard	SWT-1	Shelter	INC
Armory		091	Wallboard	SWT-1	Turret	INC
Armory		092	Wallboard	SWT-1	Turret	INC
Armory		093	Wallboard	SWT-1	Turret	NAD
Armory		094	Wallboard	SWT-1	Turret	NAD
Armory		095	Wallboard	SWT-1	Turret	NAD
Reserve	1	A-01	9" Grey VFT	2	Rm 2-1	2.7% Chrysotile
Reserve	1	A-02	9" Grey VFT	2	Rm 2-2	NA
Reserve	1	A-03	9" Grey VFT	2	Rm 2-3	NA
Reserve	2	A-04	9" Black VFT	2	Rm 2-1	INC
Reserve	2	A-05	9" Black VFT	2	Rm 2-2	INC
Reserve	2	A-06	9" Black VFT	2	Rm 2-3	INC
Reserve	3	A-07	Mastic on homo # 01 & # 07	2	Rm 2-3	INC
Reserve	3	A-08	Mastic on homo # 01 & # 07	2	Rm 2-1	INC
Reserve	3	A-09	Mastic on homo # 01 & # 07	2	Rm 2-15	INC
Reserve	4	A-10	Grey floor coating	2	Corridor	INC
Reserve	4	A-11	Grey floor coating	2	Corridor	INC
Reserve	4	A-12	Grey floor coating	2	Corridor	INC
Reserve	5	A-13	12" spline ceiling tile	2	Rm 2-1	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Reserve	5	A-14	12" spline ceiling tile	2	Entrance lobby	NAD
Reserve	5	A-15	12" spline ceiling tile	2	Rm 2-3	NAD
Reserve	6	A-16	6" Black vinyl cove base	2	Rm 2-1	INC
Reserve	6	A-17	6" Black vinyl cove base	2	Rm 2-3	INC
Reserve	6	A-18	6" Black vinyl cove base	2	Rm 2-8	INC
Reserve	7	A-19	Mastic ass. with homo # 06	2	Rm 2-1	INC
Reserve	7	A-20	Mastic ass. with homo # 06	2	Rm 2-3	INC
Reserve	7	A-21	Mastic ass. with homo # 06	2	Rm 2-8	INC
Reserve	8	A-22	12" white/grey streaks VFT	2	Rm 2-8	INC
Reserve	8	A-23	12" white/grey streaks VFT	2	Rm 2-8	INC
Reserve	8	A-24	12" white/grey streaks VFT	2	Rm 2-8	INC
Reserve	9	A-25	Mastic ass. with homo # 08	2	Rm 2-8	INC
Reserve	9	A-26	Mastic ass. with homo # 08	2	Rm 2-8	INC
Reserve	9	A-27	Mastic ass. with homo # 08	2	Rm 2-8	INC
Reserve	10	A-28	Wall board as ceiling	1	Corridor	NAD
Reserve	10	A-29	Wall board as ceiling	1	Corridor	NAD
Reserve	10	A-30	Wall board as ceiling	2	Corridor	NAD
Reserve	11	A-31	Outside window caulking (tan)	2	Roof	INC
Reserve	11	A-32	Outside window caulking (tan)	2	Roof	INC
Reserve	11	A-33	Outside window caulking (tan)	2	Roof	INC
Reserve	12	A-34	White window glazing	2	Roof	INC
Reserve	12	A-35	White window glazing	2	Roof	INC
Reserve	12	A-36	White window glazing	2	Roof	INC
Reserve	13	A-37	Coping stone caulking	R	Roof	INC
Reserve	13	A-38	Coping stone caulking	R	Roof	INC
Reserve	13	A-39	Coping stone caulking	R	Roof	INC
Reserve	14	A-40	Tar paper on fiberglass pipe insulation	B	Corridor	INC

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Reserve	14	A-41	Tar paper on fiberglass pipe insulation	B	Corridor	INC
Reserve	14	A-42	Tar paper on fiberglass pipe insulation	B	East side room	INC
Reserve	15	A-43	Cementations pipe fitting on fiberglass pipe	1	Locker room	50% Chrysotile
Reserve	15	A-44	Cementations pipe fitting on fiberglass pipe	B	Corridor	NA
Reserve	15	A-45	Cementations pipe fitting on fiberglass pipe	B	Northside room	NA
Armory	P01	P-01	1st Coat White Wall Plaster	1	RM 1W4	NAD
Armory	P02	P-02	2nd Coat Brown Wall Plaster	1	RM 1W4	NAD
Armory	P01	P-03	1st Coat White Column Plaster	1	Entrance Lobby Column	NAD
Armory	P02	P-04	2nd Coat Brown Column Plaster	1	Entrance Lobby Column	NAD
Armory	P01	P-05	1st Coat White Wall Plaster	1	East Wall of Entrance Lobby	NAD
Armory	P02	P-06	2nd Coat Brown Wall Plaster	1	East Wall of Entrance Lobby	NAD
Armory	P01	P-07	1st Coat White Wall Plaster	1	Room 1E1	NAD
Armory	P02	P-08	2nd Coat Brown Wall Plaster	1	Room 1E1	NAD
Armory	P01	P-09	1st Coat White Ceiling Plaster	1M	RM 1E3 Mezz	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory		P1	Built-up Roofing	R	Existing probe -P1	4% Chrysotile
Armory	P02	P-10	2nd Coat Brown Ceiling Plaster	1M	RM 1E3 Mezz	NAD
Armory	P01	P-11	1st Coat White Ceiling Plaster	1	RM 1E5	NAD
Armory	P02	P-12	2nd Coat Brown Ceiling Plaster	1	RM 1E5	NAD
Armory	P01	P-13	1st Coat White Suspend Ceiling Plaster	1	Lobby Area of West Side Stair Case	NAD
Armory	P02	P-14	2nd Brown Coat Under # P-13	1	Lobby Area of West Side Stair Case	NAD
Armory	P01	P-15	1st Coat White Ceiling Plaster	1	RM 1W6	NAD
Armory	P02	P-16	2nd Coat Brown Ceiling Plaster	1	RM 1W6	NAD
Armory	P01	P-17	1st Coat White Wall Plaster	1	Entrance Area West Turret Room	NAD
Armory	P02	P-18	2nd Coat Brown Wall Plaster	1	Entrance Area West Turret Room	NAD
Armory	P03	P-19	1st Coat White Ceiling Plaster	2	West Side Stair Way Vestibule	NAD
Armory	R	P2	Built-up Roofing	R	Existing probe -P2	5% Chrysotile
Armory	P04	P-20	2nd Coat Brown Ceiling Plaster	2	West Side Stair Way Vestibule	NAD
Armory	P03	P-21	1st Coat White Ceiling Plaster	2		NAD
Armory	P04	P-22	2nd Coat Brown Ceiling Plaster	2		NAD
Armory	P03	P-23	1st Coat White Wall Plaster	2		NAD
Armory	P04	P-24	2nd Coat Brown Wall Plaster	2		NAD
Armory	P03	P-25	1st Coat White Column Plaster	2	Center Hallway Between Turrets	NAD
Armory	P04	P-26	2nd Coat Brown Column Plaster	2	Center Hallway Between Turrets	NAD
Armory	P03	P-27	1st Coat White Ceiling Plaster	3	Corridor Outside 3rd Floor Bar	NAD
Armory	P04	P-28	2nd Coat Brown Ceiling Plaster	3	Corridor Outside 3rd Floor Bar	NAD
Armory	P03	P-29	1st Coat White Wall Plaster	3	Wall North of Bar Room	NAD
Armory	P04	P-30	2nd Coat Brown Wall Plaster	3	Wall North of Bar Room	NAD
Armory	P03	P-31	1st Coat White Ceiling Plaster	2	East Side Room	NAD
Armory	P04	P-32	2nd Coat Brown Ceiling Plaster	2	East Side Room	NAD
Armory	P03	P-33	1st Coat White Wall Plaster	2	Corridor East End	NAD
Armory		P3-3TAB	3 Tab Shingle	R	Existing probe -P3	2% Chrysotile

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	P04	P-34	2nd Coat Brown Wall Plaster	2	Corridor East End	NAD
Armory	P03	P-35	1st Coat White Wall Plaster	3		NAD
Armory	P04	P-36	2nd Coat Brown Wall Plaster	3		NAD
Armory	P05	P-37	1st Coat White Wall Plaster	BM	RM-B-16	NAD
Armory	P06	P-38	2nd Coat Brown Wall Plaster	BM	RM-B-16	NAD
Armory	P05	P-39	1st Coat White Ceiling Plaster	BM	RM-B-16	NAD
Armory		P3-FELT	Tar Paper Underlayment	R	Existing probe -P3	2% Chrysotile
Armory		P3-PAP	Paper Underlayment	R	Existing probe -P3	NAD
Armory	P06	P-40	2nd Coat Brown Ceiling Plaster	BM	RM-B-16	NAD
Armory	P05	P-41	1st Coat White Ceiling Plaster	BM	Center S. Room Between Turrets	NAD
Armory	P06	P-42	2nd Coat Brown Ceiling Plaster	BM	Center S. Room Between Turrets	NAD
Armory	P05	P-43	1st Coat White Column Plaster	BM	Center Vestibule By Stairs Going Down	NAD
Armory	P06	P-44	2nd Coat Brown Column Plaster	BM	Center Vestibule By Stairs Going Down	NAD
Armory	P05	P-45	1st Coat White Wall Plaster	BM	N Side Wall of Shelter	NAD
Armory	P06	P-46	2nd Coat Brown Wall Plaster	BM	N Side Wall of Shelter	NAD
Armory	P05	P-47	1st Coat White Wall Plaster	BM	East Side Room of Shelter	NAD
Armory	P06	P-48	2nd Coat Brown Wall Plaster	BM	East Side Room of Shelter	NAD
Armory	P05	P-49	1st Coat White Ceiling Plaster	BM	South Side Room of Shelter	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory		P4-EXT	Built-up Roofing	R	Existing probe -P4	NAD
Armory		P4-FELT	Built-up Roofing	R	Existing probe -P4	NAD
Armory		P4-PAP	3 Tab Shingle	R	Existing probe -P5	2% Chrysotile
Armory	P06	P-50	2nd Coat Brown Ceiling Plaster	BM	South Side Room of Shelter	NAD
Armory	P05	P-51	1st Coat White Ceiling Plaster	BM	RM B-39	NAD
Armory	P06	P-52	2nd Coat Brown Ceiling Plaster	BM	RM B-39	NAD
Armory	P05	P-53	1st Coat White Wall Plaster	BM	RM B-39	NAD
Armory		P5-3TAB	Built-up Roofing	R	Existing probe -P5	Trace Chry
Armory	P06	P-54	2nd Coat Brown Wall Plaster	BM	RM B-39	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory		P5-FELT	Tar Paper Underlayment	R	Existing probe -P5	0.75% Chrysotile
Armory	R-1	R-001	Roofing	R	Flat Roof	3% Chrysotile
Armory	R-1	R-002	Roofing	R	Flat Roof - Elevated Section	NA
Armory	R-1	R-003	Roofing	R	Tower Roof	NA
Armory	R-2	R-004	Cap Stone Caulk	R	Roof	INC
Armory	R-2	R-005	Cap Stone Caulk	R	Roof	INC

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

Building	HA #	Bulk Sample	Material	Floor	Sample Coordinates	(Type & %)
Armory	R-2	R-006	Cap Stone Caulk	R	Roof	INC
Armory	1	R-1	Built-up Roofing (upper)	R	Main Roof	4% Chrysotile
Armory	2	R-2	3-Tab Shingle (lower)	R	Main Roof	3.6% Chrysotile
Armory	3	R-3	Tar Paper Underlayment (lower)	R	Main Roof	NAD
Armory	4	R-4	Paper Underlayment (lower)	R	Main Roof	NAD
Armory	SB-1	SB001	Boiler Mud	SB	Boiler Room	NAD
Armory	SB-1	SB002	Boiler Mud	SB	Boiler Room	NAD
Armory	SB-1	SB003	Boiler Mud	SB	Boiler Room	NAD
Armory	SB-2	SB004	Breeching Insulation	SB	Boiler Room	NAD
Armory	SB-2	SB005	Breeching Insulation	SB	Boiler Room	NAD
Armory	SB-2	SB006	Breeching Insulation	SB	Boiler Room	NAD
Armory	SB-3	SB007	Elbow Mud	SB	Boiler Room	NAD
Armory	SB-3	SB008	Elbow Mud	SB	Boiler Room	NAD
Armory	SB-3	SB009	Elbow Mud	SB	Boiler Room	NAD

NAD - No Asbestos Detected
INC - Inconclusive by PLM
NA - Not Analysed

APPENDIX D:
ASBESTOS CONTAINING MATERIALS BY LOCATION

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	1	1E-1	-	1,050	-	-	-	
Armory	1	1E-2	20	1,050	-	-	-	
Armory	1	1E-3	20	150	4	2	1	
Armory	1	1E-4	20	1,120	6	6	3	
Armory	1	1E-5	50	120	-	-	-	
Armory	1	1E-6	50	120	5	4	2	
Armory	1	1E-7	-	-	18	18	9	
Armory	1	1E-8	-	-	10	10	5	
Armory	1	1W-1	20	200	32	6	3	
Armory	1	1W-2	60	500	6	24	12	
Armory	1	1W-3	20	500	6	24	12	
Armory	1	1W-4	20	1,050	7	38	16	
Armory	1	1W-5	-	200	4	16	8	
Armory	1	1W-6	30	400	6	24	12	
Armory	1	1W-7	-	-	-	-	-	
Armory	1	1W-8	-	-	-	-	-	
Armory	1	1W-9	230	-	24	24	24	
Armory	1	Drill Floor	3,000	-	25	50	25	100
Armory	1	SWT-1	-	-	-	-	-	
Armory	1	SWT-2	-	-	-	-	-	
Armory	1	SET-1	-	-	-	-	-	
Armory	1	SET-2	-	-	-	-	-	
Armory	2	2SE-1A	40	1,200	6	12	6	
Armory	2	2SE-1B	165	1,200	6	8	6	
Armory	2	2SE-2	30	1,200	6	12	6	
Armory	2	2SE-3	50	1,200	6	12	6	

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	2	2SE-4	30	1,200	6	12	6	
Armory	2	2SE-5	30	1,200	6	12	6	
Armory	2	2SE-6	100	1,200	7	18	9	
Armory	2	2SE-7	50	1,500	9	18	9	
Armory	2	2SW-1	-	-	5	10	5	
Armory	2	2SW-2	-	-	-	-	-	
Armory	2	2SW-3	-	-	-	-	-	
Armory	2	2SW-4	-	-	-	-	-	
Armory	2	2SW-4-Bathroom	90	3,600	-	-	-	
Armory	2	2SW-5	90	2,000	-	-	-	
Armory	2	2SW-6	-	2,000	10	20	10	
Armory	2	2SW-7	-	-	6	12	6	
Armory	2	2SWT-1	-	-	4	8	4	
Armory	2	2SWT-2	-	-	-	-	-	
Armory	2	2SET-1	-	-	4	8	4	
Armory	2	2SET-2	-					
Armory	2	Hallway	-	-	19	38	19	
Armory	3	Lounge	-	2,700	-	-	-	
Armory	3	3SET-1	50	2,100	-	-	-	
Armory	3	3SET-2	100	2,100	-	-	-	
Armory	3	3SWT1	60	1,500	-	-	-	
Armory	3	3SWT-2	-	-	-	-	-	
Armory	4	4SET-1	-	150	-	-	-	
Armory	4	4SET-2	-	-	-	-	-	
Armory	4	4SWT-1	-	-	-	-	-	
Armory	4	4SWT-2	-	-	-	-	-	

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	B	BE-17	160	-	4	10	5	
Armory	B	C12			6	6	3	
Armory	B	C13			21	24	12	
Armory	B	C15	20	-	-	-	-	
Armory	B	C16	10	-	2	8	4	
Armory	B	C17	20	-	1	4	2	
Armory	B	C18	15	-	1	4	2	
Armory	B	C19	15	-	1	2	1	
Armory	B	C20	20	-	-	-	-	
Armory	B	C21	20	-	-	-	-	
Armory	B	C22	10	-	-	-	-	
Armory	B	C23	40	-	-	-	-	
Armory	B	C24	25	-	-	-	-	
Armory	B	C33A	55	-	7	21	11	
Armory	B	C33B	55	-	-	-	-	
Armory	B	C33C	55	-	-	-	-	
Armory	B	C33D	55	-	-	-	-	
Armory	B	C33E	-	-	-	-	-	
Armory	B	C33F	-	-	15	30	15	
Armory	B	C33G	55	-	-	-	-	
Armory	B	C34	20	-	-	-	-	
Armory	B	C35	30	-	-	-	-	
Armory	B	C36	20	-	1	4	2	
Armory	B	C37	40	-	-	-	-	
Armory	B	C41	15	-	-	-	-	
Armory	B	C42	20	-	-	-	-	

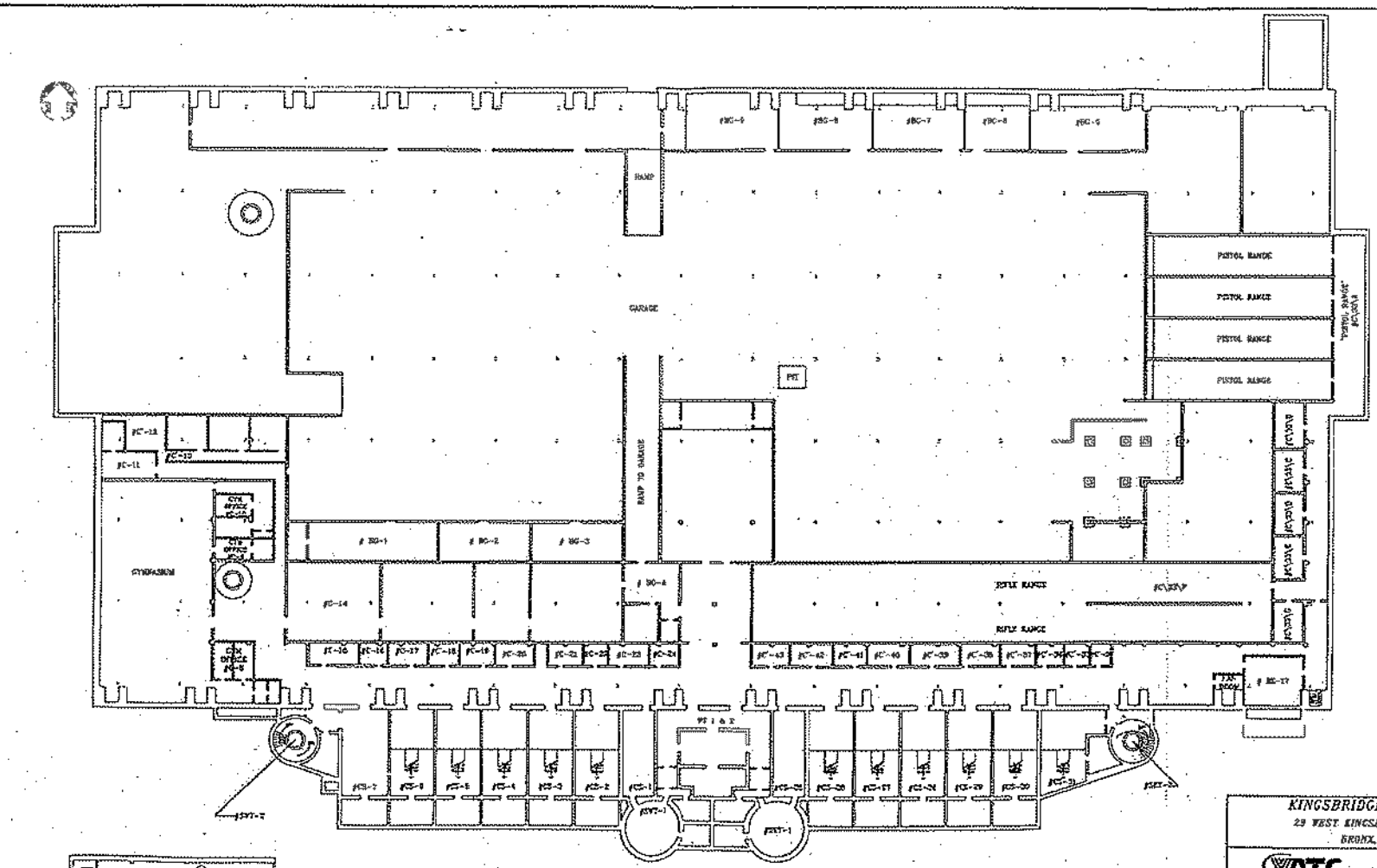
Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	B	C43	40	-	-	-	-	
Armory	B	C14	230	300	14	28	14	
Armory	B	CS1	120	-	14	12	6	
Armory	B	CS12	80	-	6	6	3	
Armory	B	CS2	165	-	12	36	24	
Armory	B	CS26	220	-	14	32	16	
Armory	B	CS27	220	-	12	32	16	
Armory	B	CS28	220	-	14	32	16	
Armory	B	CS29	140	-	14	32	16	
Armory	B	CS3	165	-	12	36	24	
Armory	B	CS30	200	-	14	32	16	
Armory	B	CS31	200	-	14	32	16	
Armory	B	CS4	165	-	15	48	28	
Armory	B	CS5	165	-	12	36	24	
Armory	B	CS6	110	-	12	36	24	
Armory	B	CS7	240	-	5	6	8	
Armory	B	CSS25	105	-	14	12	6	
Armory	B	E1	90	-				
Armory	B	Fan Room	10	-				
Armory	B	Garage	1,550	-	12	24	12	
Armory	B	Gymnasium	1,020	-				
Armory	B	Gymnasium Hallway (EW)	200	-	14	28	15	
Armory	B	Gymnasium Hallway (NS)	300	-	3	6	3	
Armory	B	C9	50	-				
Armory	B	C8	30	-				
Armory	B	C10	100	-				

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	B	SET2	25	-				
Armory	B	SET2	-	-				
Armory	B	Slop Sink Room	30	-				
Armory	B	SWTC1	40	-				
Armory	B	WT1	290	-	18	18	18	
Armory	B	WT2	290	-				
Armory	B	WTC3	50	-				
Armory	BM	A1	-	400				
Armory	BM	B1	50	-	1	4	2	
Armory	BM	B10	250	600				
Armory	BM	B13	15	-				
Armory	BM	B14	140	-				
Armory	BM	B15	40	-				
Armory	BM	B2	50	-				
Armory	BM	B23	50	-	2	4	2	
Armory	BM	B24	25	-				
Armory	BM	B25	55	-				
Armory	BM	B26	25	-				
Armory	BM	B27	30	-	1	3	2	
Armory	BM	B28	20	-				
Armory	BM	B29	50	-	2	8	4	
Armory	BM	B3	50	-	2	4	2	
Armory	BM	B30	50	-				
Armory	BM	B31	50	-				
Armory	BM	B32	50	-	1	4	2	
Armory	BM	B33	50	-	2	4	2	

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Armory	BM	B34	50	-				
Armory	BM	B35	50	-	2	8	4	
Armory	BM	B37	50	-				
Armory	BM	B38	-	-	4	1	2	
Armory	BM	B4	50	-	1	2	1	
Armory	BM	B5	50	-	1	2	1	
Armory	BM	B51	-	-				
Armory	BM	B52	-	-				
Armory	BM	B53	-	-				
Armory	BM	B54	-	-				
Armory	BM	B6	60	-	1	4	2	
Armory	BM	B7	70	-				
Armory	BM	B8	50	-	3	12	6	
Armory	BM	B9	50	-				
Armory	BM	B39			9	36	18	
Armory	BM	B40						
Armory	BM	Balcony	-	-				
Armory	BM	Hallway	20	-	34	68	34	
Armory	BM	Lecture Hall	60	-				
Armory	BM	Loading Area	400	-				9.00
Armory	BM	Open Store Areas	-	-				
Armory	R	Roofing						
Armory	SB	Boiler Room	-	-				
Shelter	B	C33E	55	-				
Shelter	B	C33F	55	-				
Shelter	B	C38	40	-				

Building	Floor	Room/Location	Thermal System Insulation	Floor Tile/Flooring Material	Fixtures	Florescent Tubes	Ballasts	Metal Halides
Shelter	B	C39	80	-				
Shelter	B	C40	35	-				
		Flooring Total		**9,850**				
		Thermal System Total	**14,315**		**623**	**1,247**	**680**	**109**
		Roofing Total	**235,000**					

APPENDIX H:
SURVEY DRAWINGS



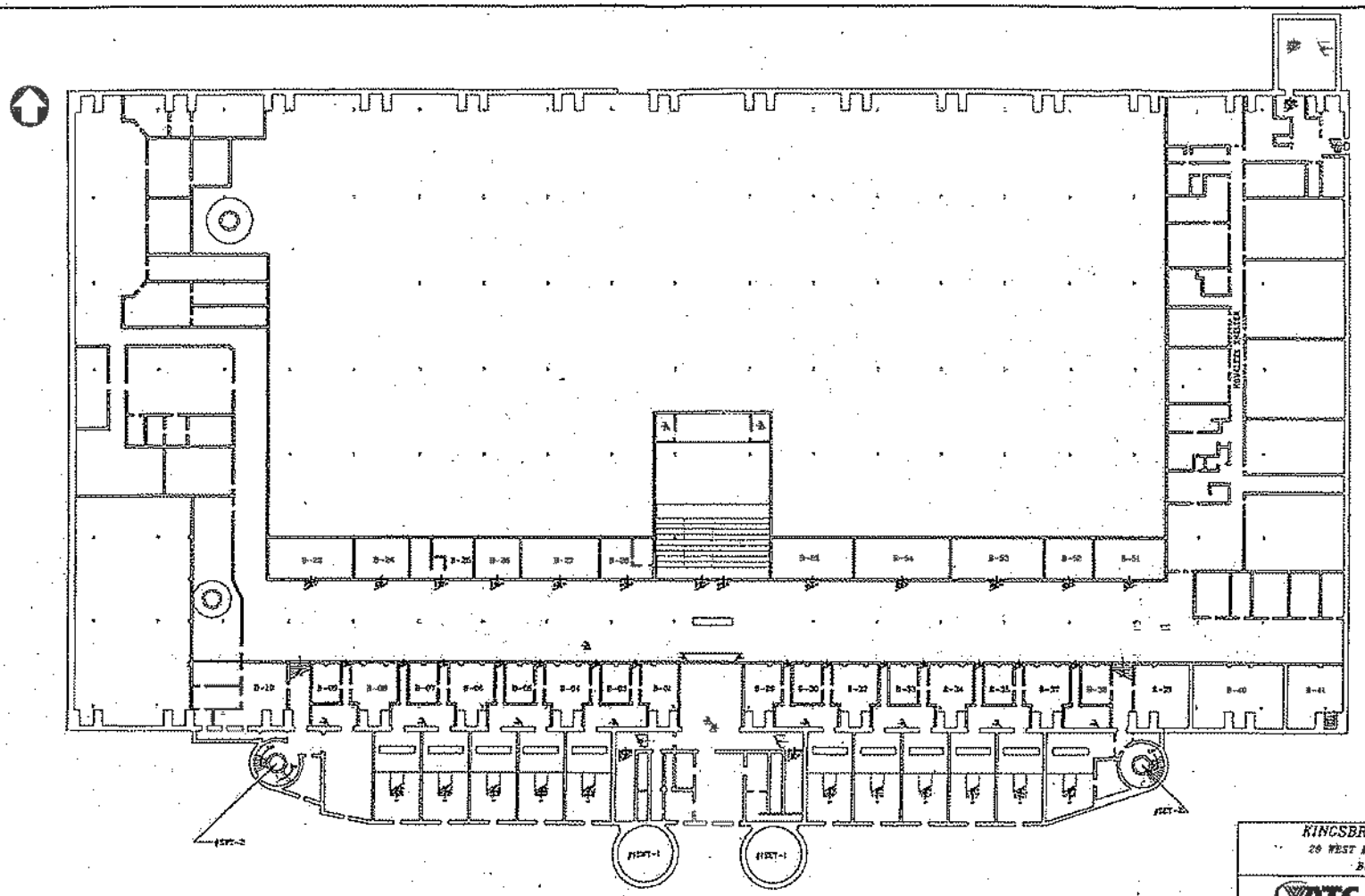
KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

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ROOM NUMBERS
BASEMENT AND SUB BASEMENT
"BOILER ROOM"

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DRAWN BY: K. FROLOV	SCALE: NOT TO SCALE
CHECKED BY: J. RUCHALSKI	DATE: 09/21/00 A-1

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BASEMENT MEZZANINE PLAN

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

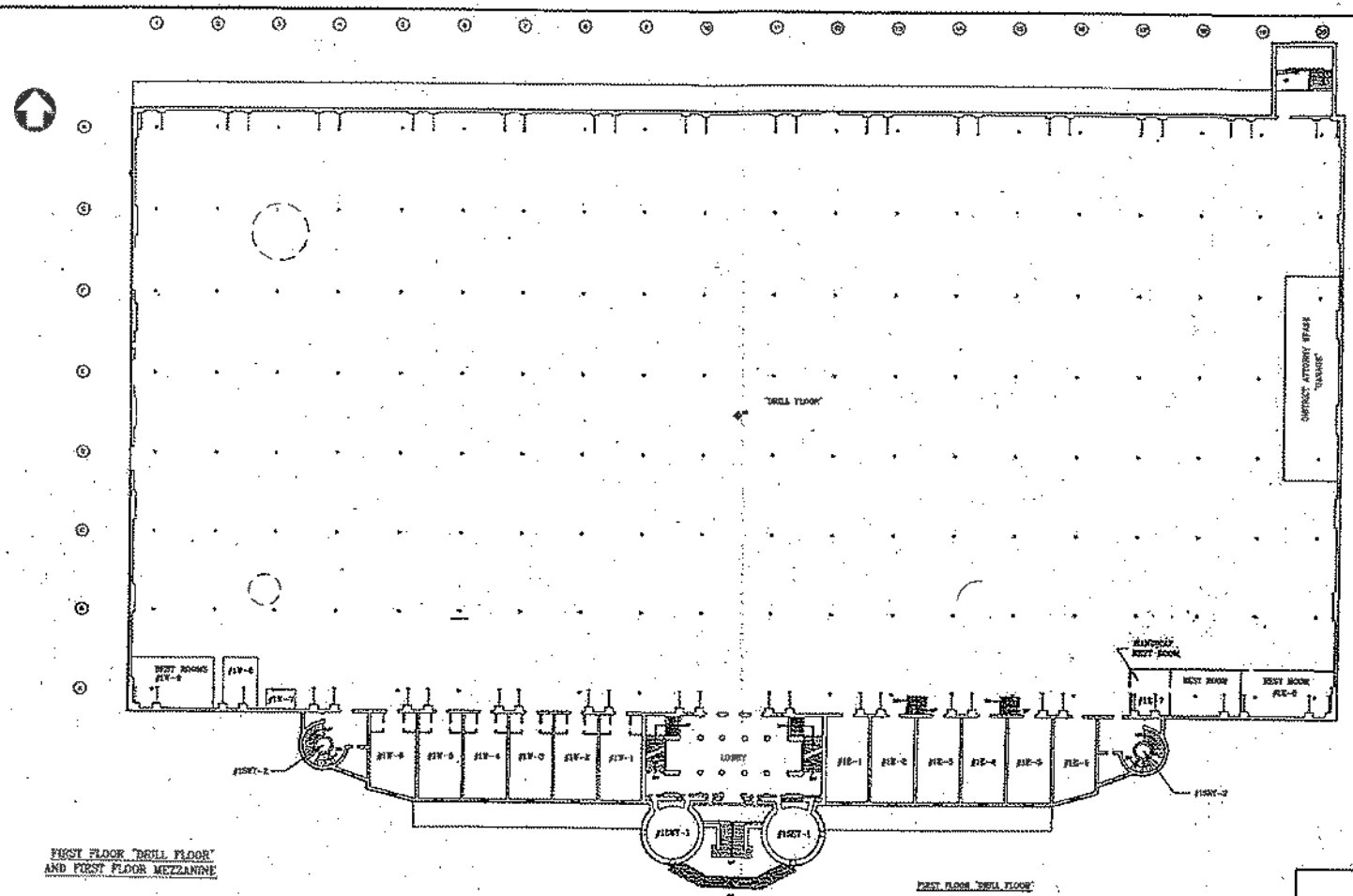
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ROOM NUMBERS

BASEMENT MEZZANINE PLAN

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DRAWN BY: Y. MOLCHANENKO	SCALE: NOT TO SCALE
CHECKED BY: J. RUCHALSKI	DATE: 06/21/08 A-2

FILE: M:\CADD#\750118.001\A-2



FIRST FLOOR "DRILL FLOOR" AND FIRST FLOOR MEZZANINE

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29 WEST KINGSBRIDGE ROAD,
BRONX, NY

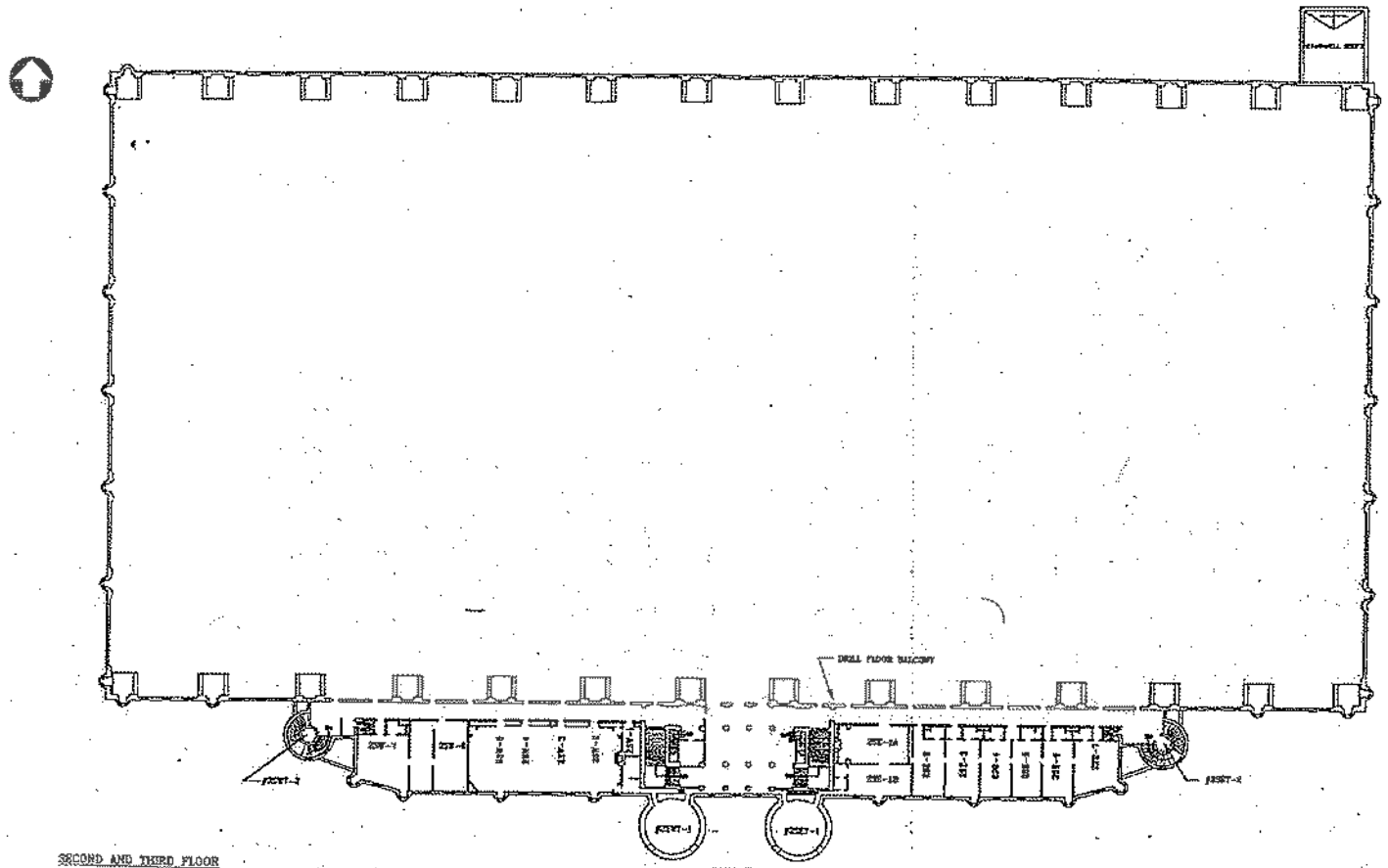
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ROOM NUMBER

FIRST FLOOR "DRILL FLOOR" AND FIRST FLOOR MEZZANINE

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DRAWN BY: V.NOLCRAMENKO	SCALE: NOT TO SCALE
CHECKED BY: J. RUCHALSKI	DATE: 09/21/00 A-3

FILE: M:\CADS\75016.001\A-3



SECOND AND THIRD FLOOR

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

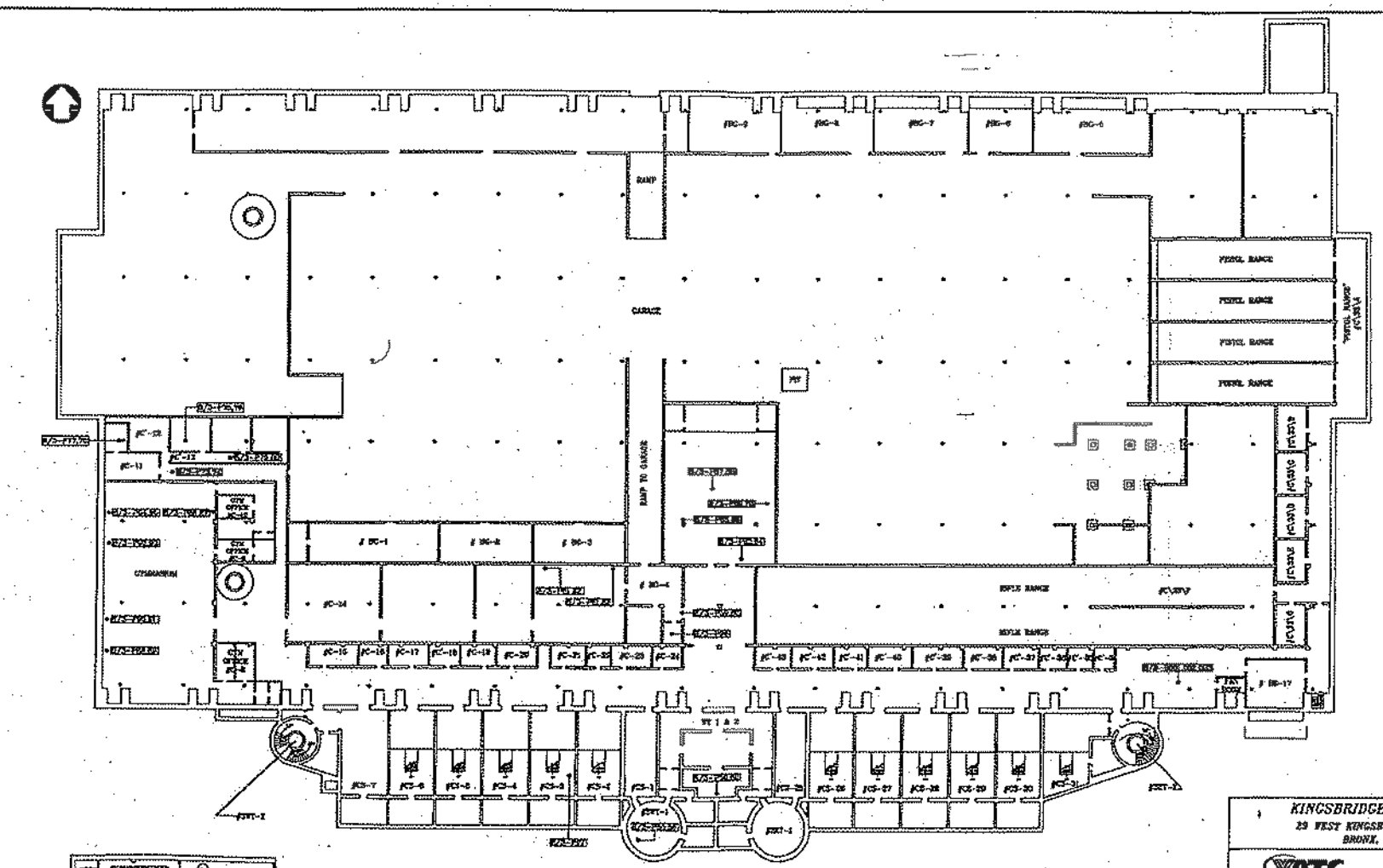
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ROOM NUMBERS

SECOND AND THIRD FLOOR

PROJ. #75018	FILE: M:\CADD#\75018.001\A-4	
DRAWN BY: Y.KOLCHANENKO	SCALE: NOT TO SCALE	
CHECKED BY: J. RUCHALSKI	DATE: 03/21/00	A-4

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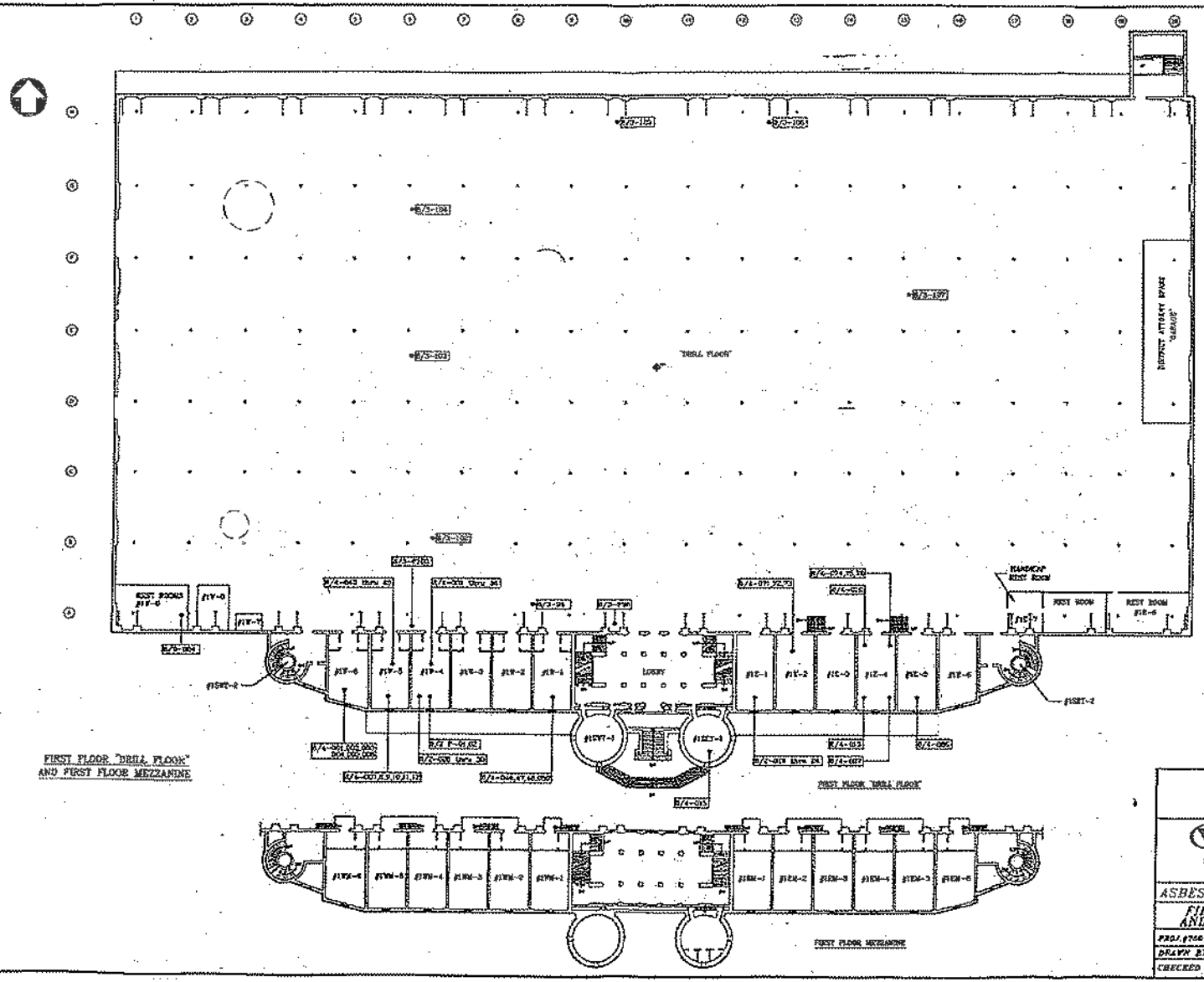
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29 WEST KINGSBRIDGE ROAD,
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ASBESTOS BULK SAMPLE LOCATIONS
BASEMENT AND SUB BASEMENT
"BOILER ROOM"

PROJECT#: 01A	FILE: N:\CLOSE\175001B.001\A-BU
DRAWN BY: V. PROLOY	SCALE: NOT TO SCALE
CHECKED BY: J. RUCHALSKI	DATE: 08/15/00

A-BU



FIRST FLOOR "DRILL FLOOR" AND FIRST FLOOR MEZZANINE

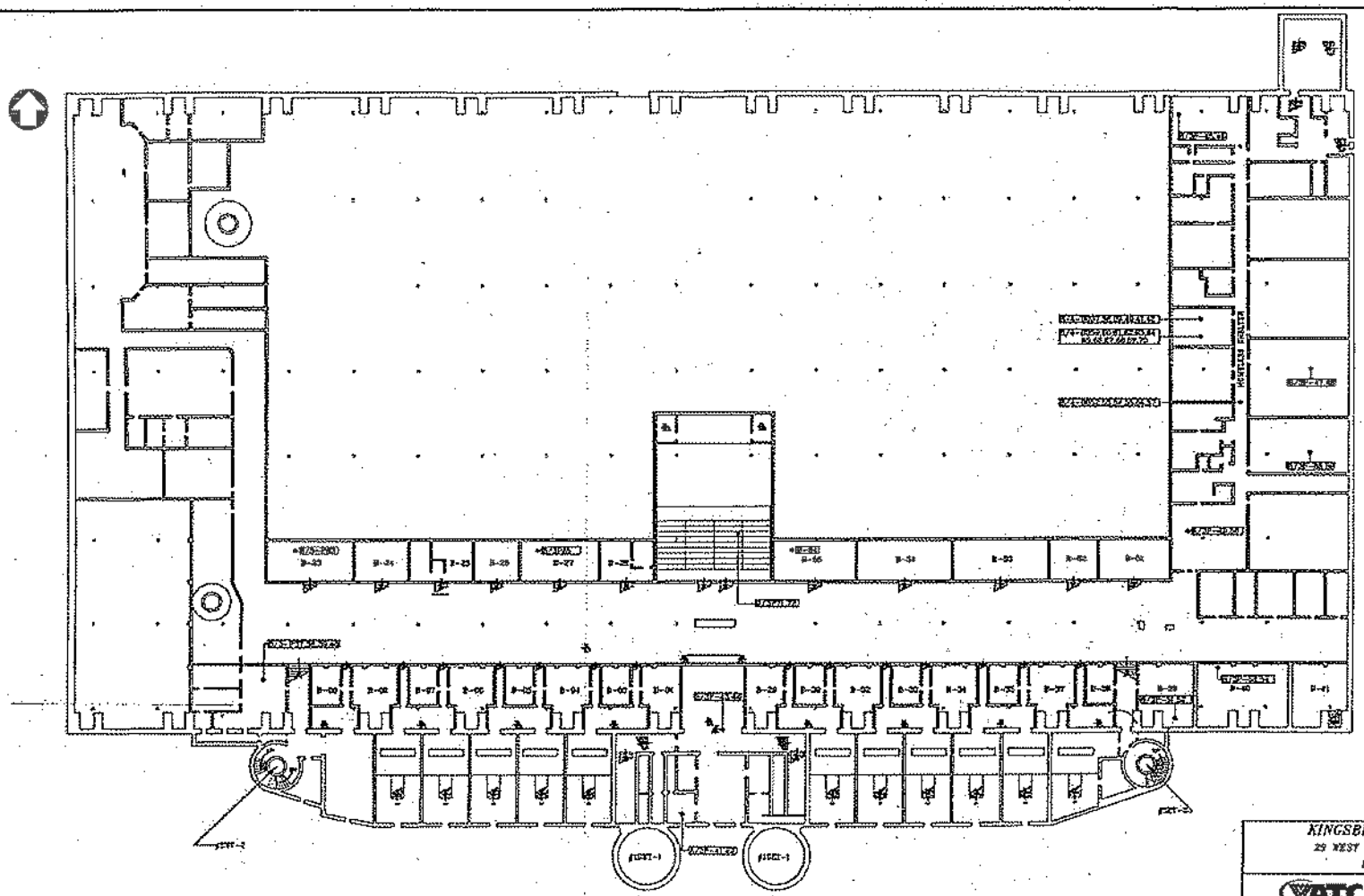
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ASBESTOS BULK SAMPLE LOCATIONS
FIRST FLOOR "DRILL FLOOR" AND FIRST FLOOR MEZZANINE

PROJ.#75018	FILE: M:\CAD94\75018.061\AB-3
DRAWN BY: V.MOLCHANENKO	SCALE: NOT TO SCALE
CHECKED BY: J. ROCHALSKI	DATE: 08/21/00 AB-3

FILE: M:\CAD94\75018.061\AB-3



BASEMENT MEZZANINE PLAN

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

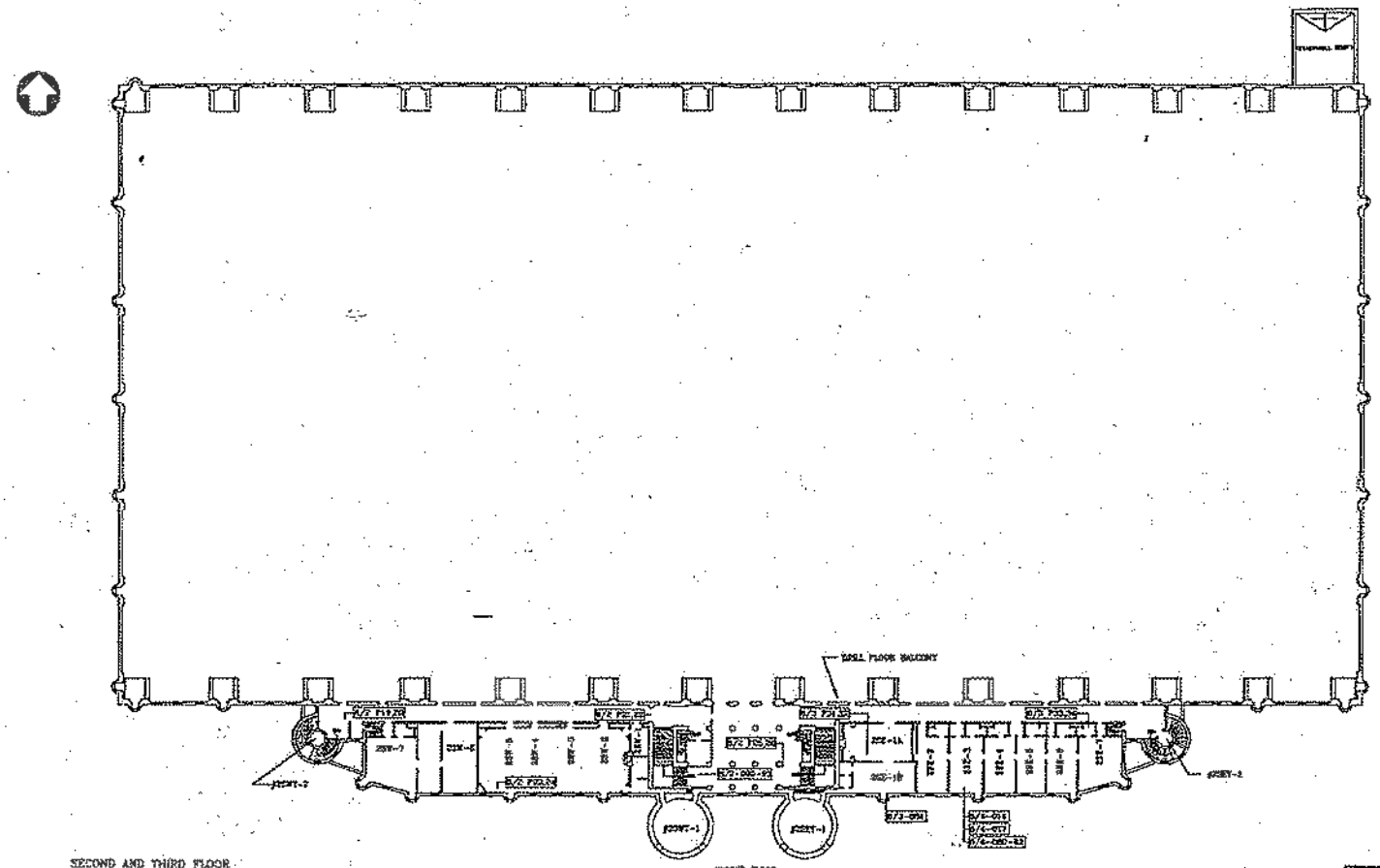
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ASBESTOS BULK SAMPLE LOCATIONS

BASEMENT MEZZANINE PLAN

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DRAWN BY: V. MOLCHANENKO	SCALE: NOT TO SCALE
CHECKED BY: J. BUCBALSKI	DATE: 09/21/00 AB-2

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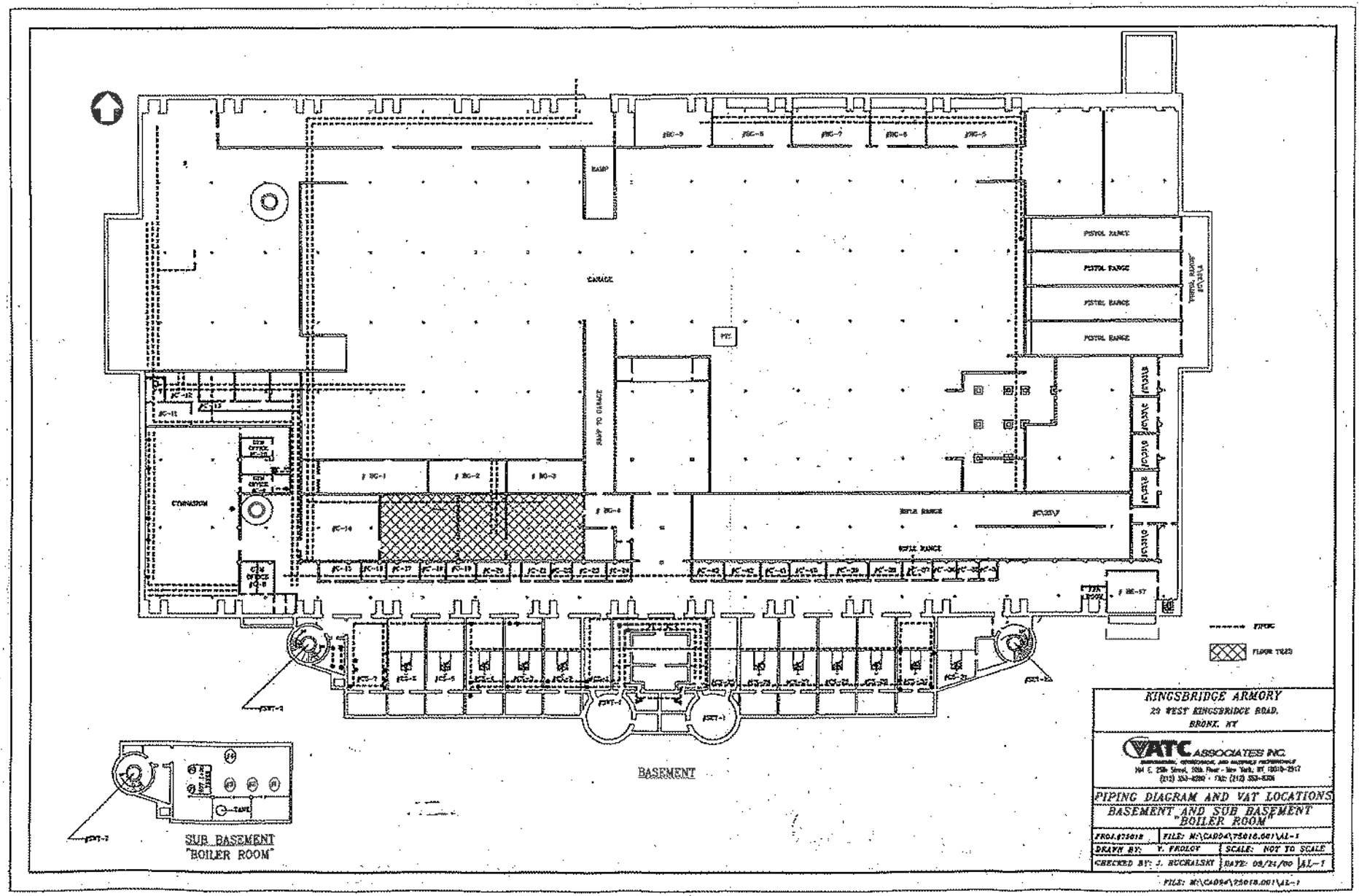
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29 WEST KINGSBRIDGE ROAD.
BRONX, NY

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ASBESTOS BULK SAMPLE LOCATIONS
SECOND AND THIRD FLOOR

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DRAWN BY: Y.MOLCHANENKO	SCALE: NOT TO SCALE
CHECKED BY: J. KUCHALSKI	DATE: 09/21/00 AB-4

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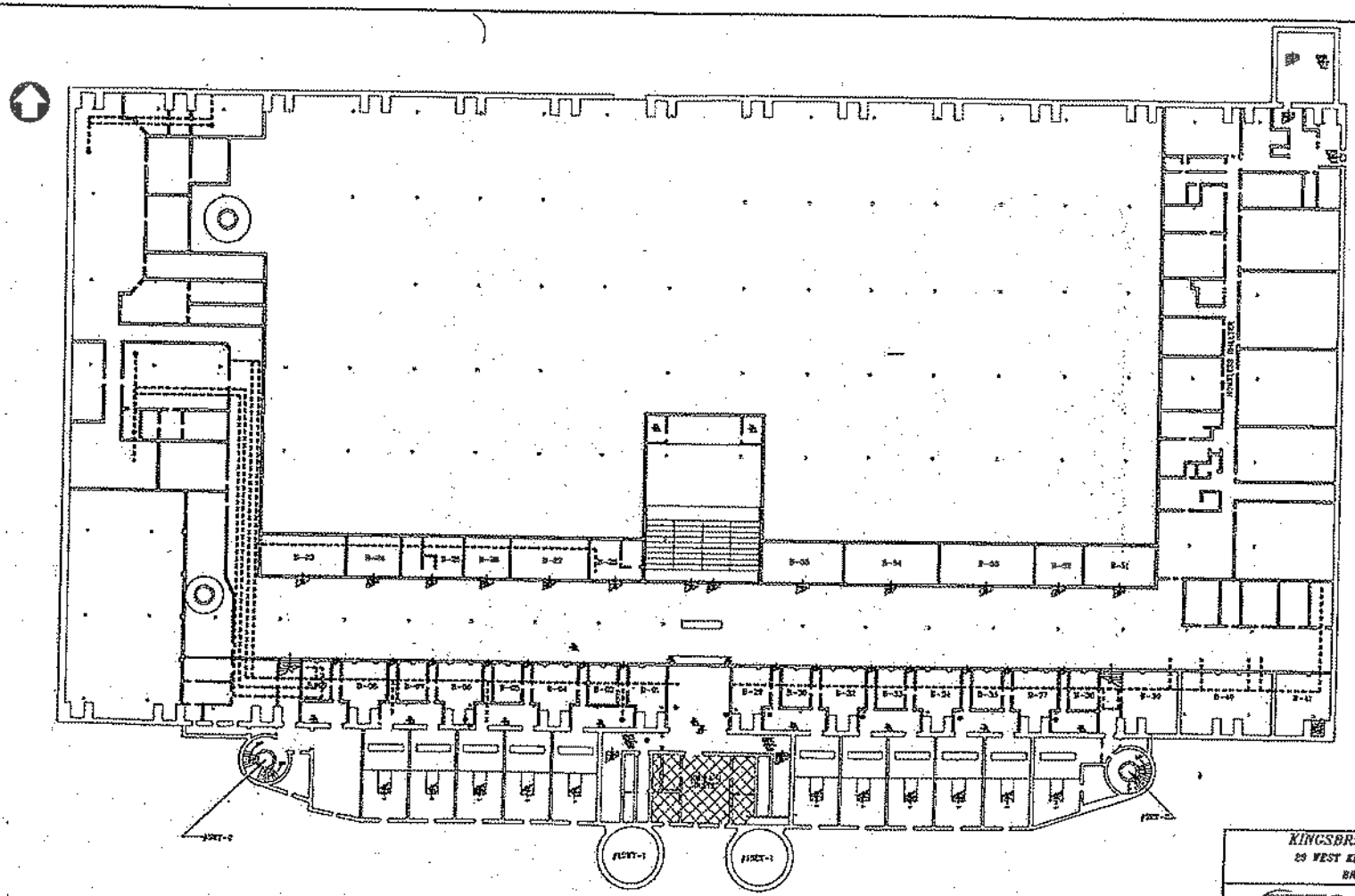
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PIPING DIAGRAM AND VAT LOCATIONS
BASEMENT AND SUB BASEMENT
"BOILER ROOM"

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DRAWN BY: Y. FROLOV	SCALE: NOT TO SCALE
CHECKED BY: J. BUCHALSKY	DATE: 08/24/00 AL-1

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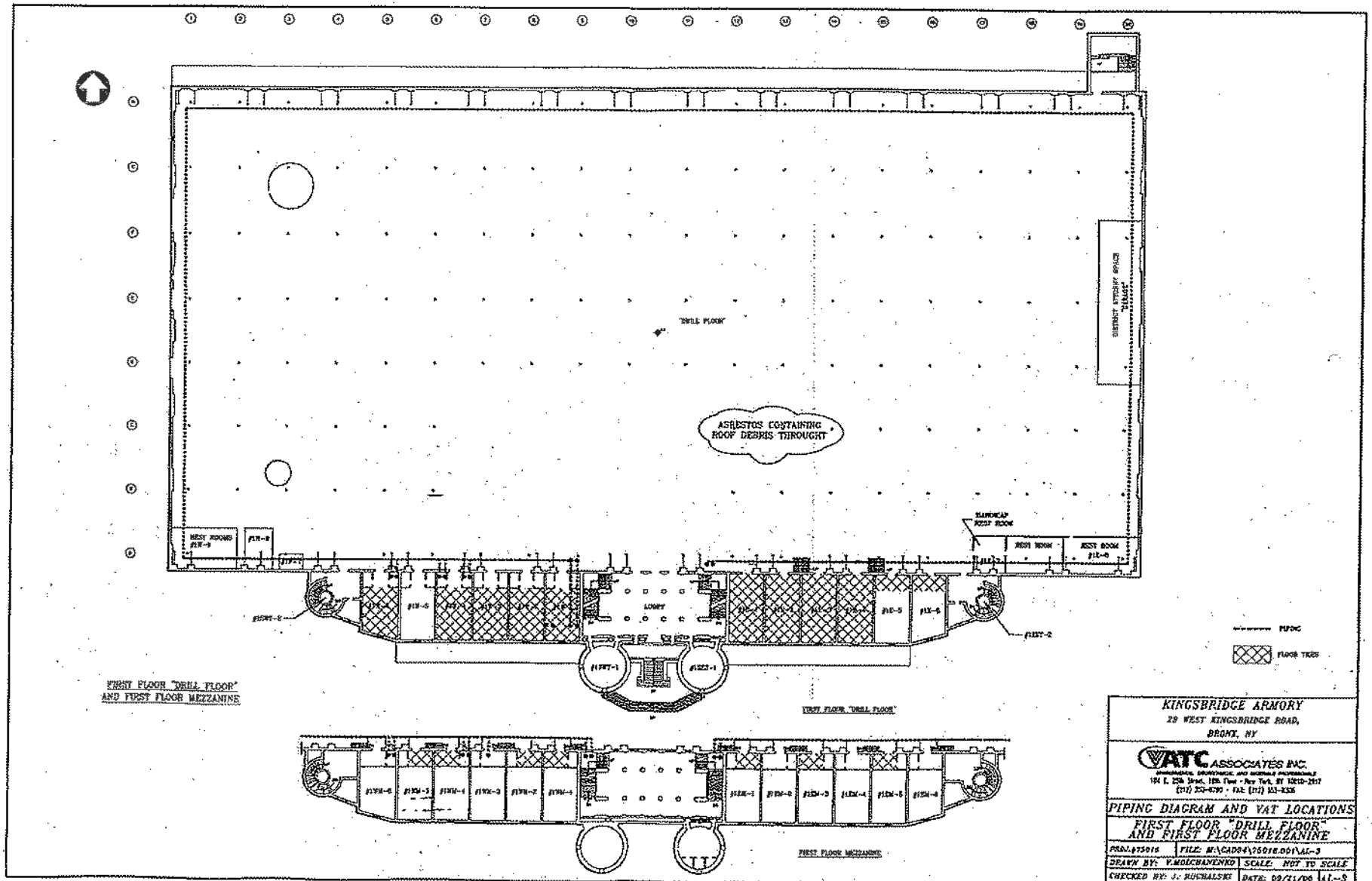
BASEMENT MEZZANINE PLAN

KINGSBRIDGE ARMORY
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PIPING DIAGRAM AND VAT LOCATIONS

BASEMENT MEZZANINE PLAN



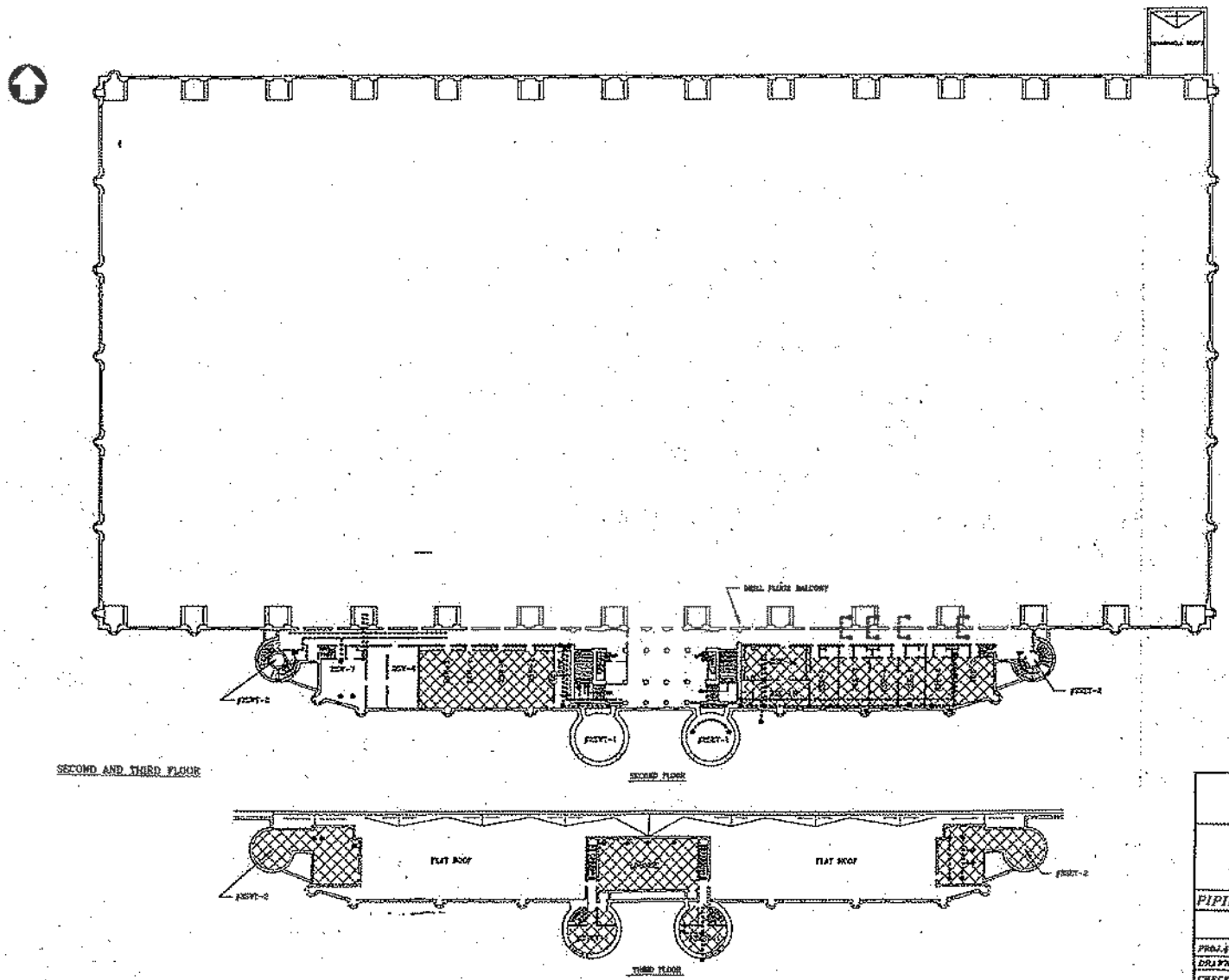
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PIPING DIAGRAM AND VAT LOCATIONS
FIRST FLOOR "DRILL FLOOR" AND FIRST FLOOR MEZZANINE

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DRAWN BY: V.MOLCHANENKO	SCALE: NOT TO SCALE
CHECKED BY: J. KUCHALSKI	DATE: 09/21/06 AL-3

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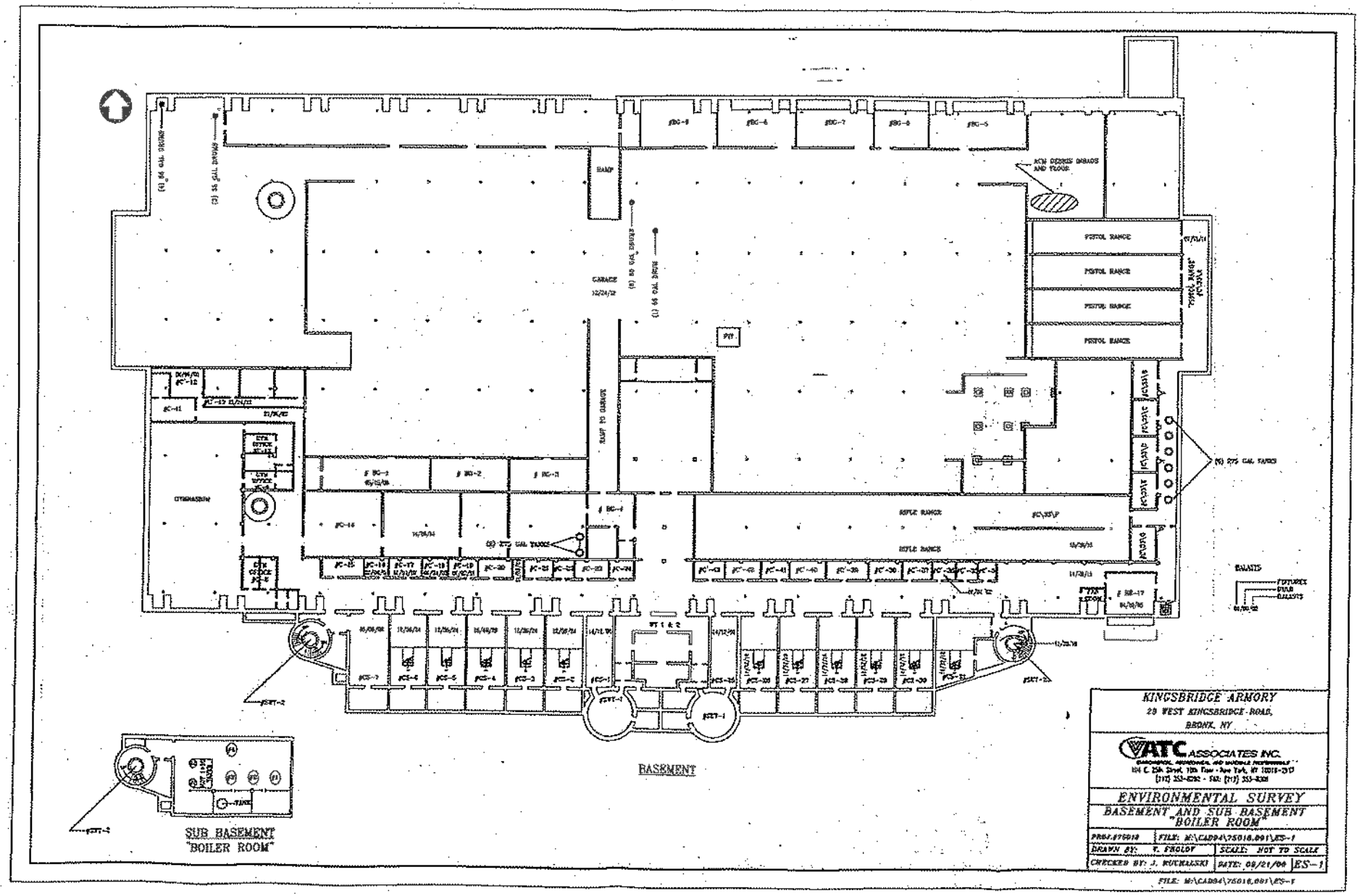
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PIPING DIAGRAM AND VAT LOCATIONS
SECOND AND THIRD FLOOR

PROJ.#75018	FILE: M:\CAD04\75018.001\AL-4	
DRAWN BY: Y.MOLCHANENKO	SCALE: NOT TO SCALE	
CHECKED BY: J. BUCHALSKI	DATE: 03/21/00	AL-4

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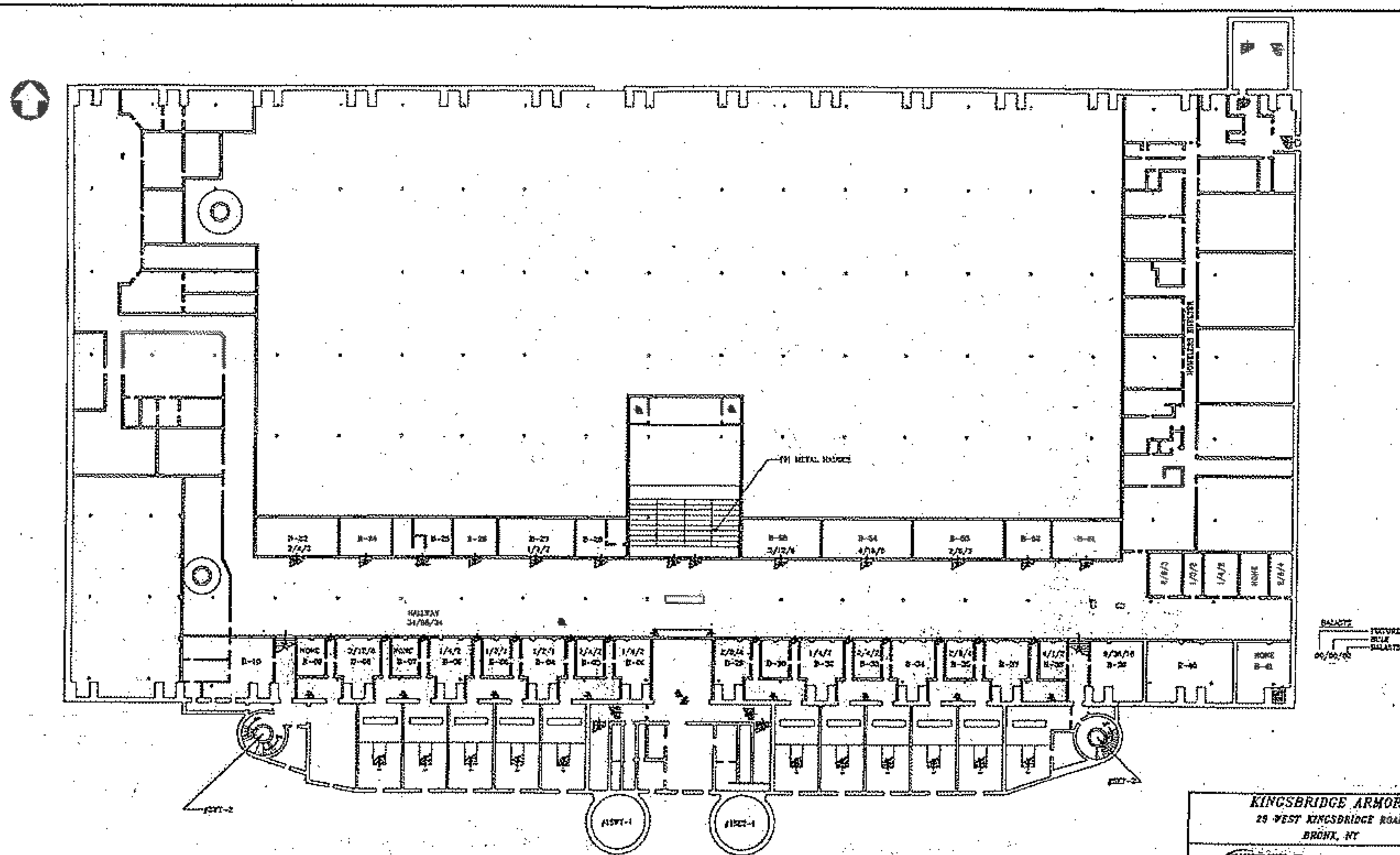
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ENVIRONMENTAL SURVEY
BASEMENT AND SUB BASEMENT
"BOILER ROOM"

PROJ.#75018	FILE: M:\CAD94\75018.001\ES-1
DRAWN BY: Y. FROLOV	SCALE: NOT TO SCALE
CHECKED BY: J. KUCHALESKI	DATE: 08/21/06 ES-1

FILE: M:\CAD94\75018.001\ES-1



BASEMENT MEZZANINE PLAN

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD,
BRONX, NY

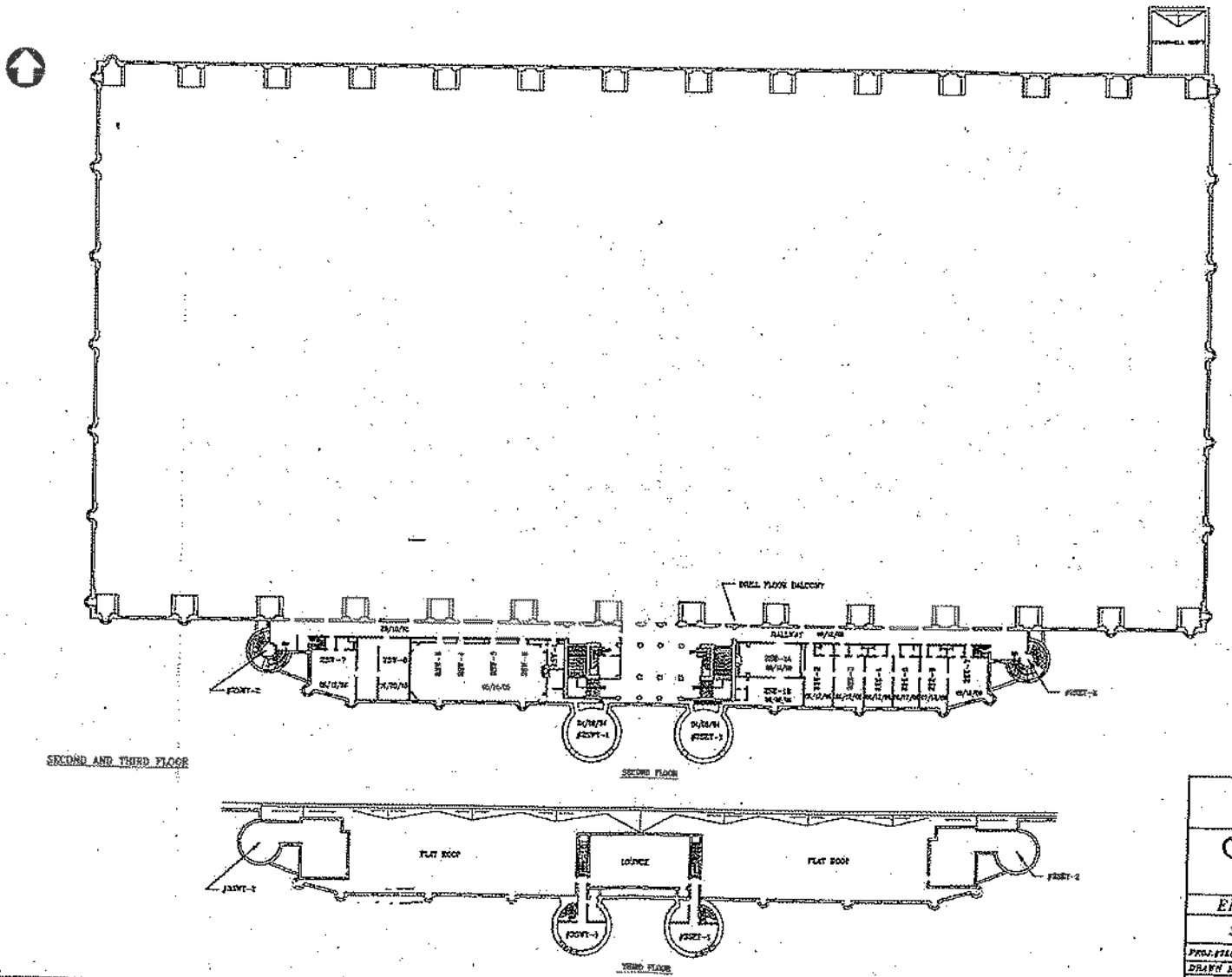
ATC ASSOCIATES INC.

ENVIRONMENTAL SURVEY

BASEMENT MEZZANINE PLAN

PROJ.#75018	FILE: M:\CAD94\75018.001\ES-2
DRAWN BY: V. KOLCHANENKO	SCALE: NOT TO SCALE
CHECKED BY: J. RUCHALSKI	DATE: 09/21/00 ES-2

FILE: M:\CAD94\75018.001\ES-2



SECOND AND THIRD FLOOR

KINGSBRIDGE ARMORY
29 WEST KINGSBRIDGE ROAD
BRONX, NY

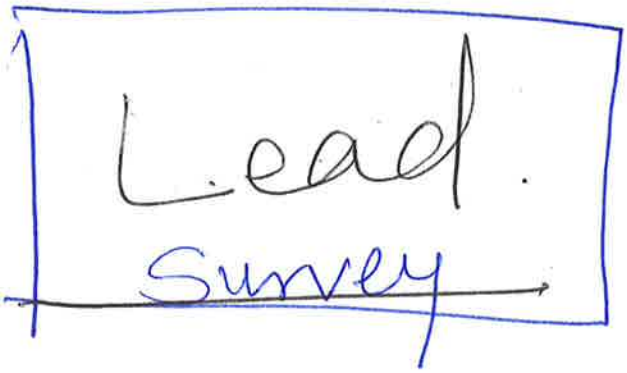
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ENVIRONMENTAL SURVEY

SECOND AND THIRD FLOOR

PROJ: 175018	FILE: M:\CAD94\75018.001\ES-4
DRAWN BY: W.HOLCHANENKO	SCALE: NOT TO SCALE
CHECKED BY: J. BUCHALSKI	DATE: 09/21/00 ES-4

FILE: M:\CAD94\75018.001\ES-4



APPENDIX E:
XRF SURVEY DATA AND BULK SAMPLES

Tab. 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	1	Calibrate						1.9		
7/24	2	Calibrate						1.7	Avg. 1.8	
7/24	3	Calibrate						1.8		
7/24	4	Boiler room	Wall	1	Concrete	White	Poor	>9.9	Positive	
7/24	5	Basement	Wall	2	Concrete	Grey	Poor	0.4		
7/24	6	Basement	Wall	3	Brick	Grey	Poor	7.1	Positive	
7/24	7	Basement	Wall	3	Concrete	White	Poor	0.5		
7/24	8	Basement	Wall	4	Concrete	Grey	Poor	8.5	Positive	
7/24	9	Basement	Column	6	Concrete	White	Poor	4.5	Positive	
7/24	10	Basement	Boiler units	6	Metal	Grey	Fair	0.0		
7/24	11	Basement	Hot water heater	1	Metal	Brown	Fair	0.4		
7/24	12	Basement	Horizontal duct	5	Metal	Grey	Fair	0.0		
7/24	13	Basement	Ceiling	5	Concrete	Grey	Poor	2.9	Positive	
7/24	14	Basement	Hand rail	2	Metal	Grey	Fair	0.4		
7/24	15	Basement	Stair tread	2	Metal	Grey	Poor	1.0	Positive	Negative
7/24	16	R#1	Wall	1	Concrete	White	Poor	-0.0		
7/24	17	R#1	Wall	3	Concrete	White	Poor	0.3		
7/24	18	R#1	Ceiling	5	Concrete	Grey	Poor	0.0		
7/24	19	R#2	Wall	1	Brick	White	Poor	0.1		
7/24	20	R#2	Wall	1	Concrete	White	Poor	0.2		
7/24	21	R#2	Wall	2	Concrete	White	Poor	-0.1		
7/24	22	R#2	Wall	3	Brick	Grey	Poor	>9.9	Positive	
7/24	23	R#2	Wall	4	Brick	White	Poor	-0.1		
7/24	24	R#2	Door	2	Metal	Grey	Poor	>9.9	Positive	

Tab. I
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	25	R#2	Control panel	3	Metal	Grey	Poor	1.0		Negative
7/24	26	R#3	Door	1	Metal	Green	Poor	5.3	Positive	
7/24	27	R#3	Wall	1	Brick	White	Poor	-0.1		
7/24	28	R#3	Wall	2	Brick	White	Poor	-0.2		
7/24	29	R#3	Wall	3	Concrete	White	Poor	-0.1		
7/24	30	R#3	Wall	4	Concrete	White	Poor	-0.1		
7/24	31	R#3	Control panel	2	Metal	Green	Poor	0.0		
7/24	32	R#3	Cabin	1	Metal	Grey	Poor	0.5		
7/24	33	Boiler room	Door	4	Metal	Grey	Poor	>9.9	Positive	
7/24	34	R#4	Door	1	Metal	Grey	Poor	5.6	Positive	
7/24	35	R#4	Wall	1	Concrete	Grey	Poor	0.3		
7/24	36	R#4	Wall	2	Concrete	Grey	Poor	0.1		
7/24	37	R#4	Wall	3	Concrete	Grey	Poor	0.3		
7/24	38	R#4	Wall	4	Concrete	Grey	Poor	0.2		
7/24	39	R#5	Roof	1	Metal	Grey	Poor	>9.9	Positive	
7/24	40	R#5	Wall	1	Brick	Grey	Poor	-0.2		
7/24	41	R#5	Wall	2	Brick	Grey	Poor	-0.1		
7/24	42	R#5	Wall	3	Concrete	Grey	Poor	0.1		
7/24	43	R#5	Wall	4	Concrete	Grey	Poor	0.4		
7/24	44	R#5	Horizontal pipe	6	Metal	Grey	Fair	1.4	Positive	
7/24	45	R#5	Pipe riser	6	Metal	Grey	Fair	0.7		
7/24	46	R#5	Gas booster	6	Metal	Blue	Fair	-0.1		
7/24	47	R#6	Door	1	Metal	Grey	Poor	>9.9	Positive	
7/24	48	R#6	Wall	1	Concrete	Grey	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	49	R#6	Wall	2	Concrete	Grey	Poor	0.0		
7/24	50	R#6	Wall	3	Concrete	White	Poor	-0.2		
7/24	51	R#6	Wall	4	Concrete	Grey	Poor	-0.0		
7/24	52	R#6	Wall	1	Concrete	White	Poor	0.4		
7/24	53	R#6	Wall	2	Concrete	Grey	Poor	7.9	Positive	
7/24	54	R#6	Wall	3	Concrete	White	Poor	-0.1		
7/24	55	R#6	Wall	4	Concrete	Grey	Poor	>9.9	Positive	
7/24	56	R#6	Door	1	Metal	Grey	Poor	0.1		
7/24	57	R#6	Door case	1	Metal	Grey	Poor	-0.1		
7/24	58	Staircase	Wall	2	Brick	White	Fair	3.6	Positive	
7/24	59	Staircase	Wall	3	Brick	Grey	Fair	>9.9	Positive	
7/24	60	Staircase	Wall	4	Brick	Grey	Fair	2.0	Positive	
7/24	61	Staircase	Stair tread	6	Concrete	Grey	Poor	0.0		
7/24	62	Staircase	Stair riser	6	Concrete	Grey	Poor	0.1		
7/24	63	Staircase	Stringer	6	Concrete	Grey	Poor	-0.2		
7/24	64	Staircase	Hand rail	6	Brick	Grey	Poor	3.0	Positive	
7/24	65	Corridor	Wall	1	Brick	White	Poor	6.7	Positive	
7/24	66	Mezzanine	Wall	2	Brick	Grey	Poor	7.3	Positive	
7/24	67	Basement	Wall	3	Brick	White	Poor	0.2	Positive	
7/24	68	Basement	Wall	3	Concrete	Grey	Poor	0.2		
7/24	69	Basement	Wall	4	Brick	White	Poor	5.2	Positive	
7/24	70	R#1	Door	1	Wood	Green	Poor	0.5		
7/24	71	SWTC	Door case	1	Wood	Green	Poor	0.3		
7/24	72	SWTC	Door case	1	Brick	Blue	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	73	SWTC	Door case	2	Brick	Blue	Poor	0.1		
7/24	74	SWTC	Door case	3	Concrete	Blue	Poor	1.5	Positive	
7/24	75	R#1	Wall	4	Brick	Blue	Poor	0.5		
7/24	76	SWTC	Pipe riser	2	Metal	Blue	Poor	0.3		
7/24	77	R#2	Door	1	Metal	Blue	Poor	1.4	Positive	
7/24	78	SWTC	Door case	1	Metal	Blue	Poor	1.7	Positive	
7/24	79	SWTC	Wall	1	Brick	Blue	Poor	>9.9	Positive	
7/24	80	SWTC	Wall	2	Brick	Blue	Poor	>9.9	Positive	
7/24	81	SWTC	Wall	3	Brick	Blue	Poor	>9.9	Positive	
7/24	82	SWTC	Wall	4	Brick	Blue	Poor	>9.9	Positive	
7/24	83	SWTC	Pipe riser	4	Metal	Blue	Poor	2.4	Positive	
7/24	84	SWTC	Window sash	3	Wood	Blue	Poor	>9.9	Positive	
7/24	85	SWTC	Window sash	3	Wood	Blue	Poor	>9.9	Positive	
7/24	86	SWTC	Window case	3	Wood	Blue	Poor	>9.9	Positive	
7/24	87	SWTC	Window apron	3	Wood	Blue	Poor	>9.9	Positive	
7/24	88	Corridor	Radiator	1	Metal	White	Poor	0.4		
7/24	89	R#4	Door 1	1	Metal	Grey	Poor	1.0	Positive	
7/24	90	C16	Door case	1	Metal	Grey	Poor	1.9	Positive	
7/24	91	C16	Door 2	1	Metal	Grey	Poor	-0.1		
7/24	92	C16	Wall	1	Concrete	Blue	Poor	0.1		
7/24	93	C16	Wall	2	Concrete	Blue	Poor	-0.4		
7/24	94	C16	Wall	3	Brick	Blue	Poor	0.5		
7/24	95	C16	Wall	4	Concrete	Blue	Poor	0.3		
7/24	96	C16	Beam	3	Metal	Blue	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	97	R#5	Door 1	1	Metal	Grey	Poor	4.2	Positive	
7/24	98	C17	Door case	1	Metal	Grey	Poor	-0.2		
7/24	99	C17	Door 2	1	Metal	Grey	Poor	-0.0		
7/24	100	C17	Wall	1	Concrete	White	Poor	-0.1		
7/24	101	C17	Wall	2	Concrete	Grey	Poor	0.1		
7/24	102	C17	Wall	3	Brick	White	Poor	0.3		
7/24	103	C17	Wall	4	Brick	Grey	Poor	0.1		
7/24	104	C17	Beam	3	Metal	White	Poor	>9.9	Positive	
7/24	105	C17	Pipe riser	5	Metal	White	Poor	9.1	Positive	
7/24	106	R#6	Door	1	Metal	Black	Poor	2.2	Positive	
7/24	107	C18	Door case	1	Metal	Grey	Poor	-0.1		
7/24	108	C18	Door case	1	Metal	Grey	Poor	0.3		
7/24	109	C18	Wall	1	Concrete	Grey	Poor	-0.3		
7/24	110	C18	Wall	2	Concrete	White	Poor	0.3		
7/24	111	C18	Wall	3	Brick	Grey	Poor	-0.1		
7/24	112	R#6	Wall	4	Concrete	Grey	Poor	-0.0		
7/24	113	C18	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	114	C18	Pipe	5	Metal	Grey	Poor	7.1	Positive	
7/24	115	C18	Frame	4	Wood	Grey	Poor	0.1		
7/24	116	R#7	Door	1	Metal	Grey	Poor	1.4	Positive	
7/24	117	C19	Door case	1	Metal	Grey	Poor	2.3	Positive	
7/24	118	C19	Door	1	Metal	Grey	Poor	0.0		
7/24	119	C19	Wall	1	Concrete	Grey	Poor	3.7	Positive	
7/24	120	C19	Wall	2	Concrete	Grey	Poor	6.0	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	121	C19	Wall	3	Brick	Grey	Poor	5.1	Positive	
7/24	122	C19	Wall	4	Concrete	Grey	Poor	1.4	Positive	
7/24	123	C19	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	124	C19	Horizontal pipe	5	Metal	Grey	Poor	9.4	Positive	
7/24	125	C19	Shelf	3	Wood	Grey	Poor	-0.1		
7/24	126	C19	Shelf sup.	1	Wood	Grey	Poor	0.3		
7/24	127	Alarm	Gate	1	Metal	Grey	Poor	-0.1		
7/24	128	Control room	Wall	2	Concrete	Grey	Fair	+0.2		
7/24	129	Control room	Wall	3	Brick	Grey	Poor	0.3		
7/24	130	Control room	Wall	4	Concrete	Grey	Fair	-0.0		
7/24	131	Control room	Pipe horizontal	5	Metal	Grey	Poor	>9.9	Positive	
7/24	132	Control room	Control panel	4	Metal	Red	Fair	0.0		
7/24	133	Control room	Beam	3	Metal	White	Poor	>0.0	Positive	
7/24	134	R#8	Door	1	Metal	Grey	Poor	1.4	Positive	
7/24	135	C21	Door case	1	Metal	Grey	Poor	2.4	Positive	
7/24	136	C21	Wall	1	Concrete	White	Poor	2.6	Positive	
7/24	137	C21	Wall	2	Concrete	Grey	Poor	2.4	Positive	
7/24	138	C21	Wall	3	Brick	White	Poor	5.7	Positive	
7/24	139	C21	Wall	4	Concrete	Grey	Poor	0.0		
7/24	140	C21	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	141	C21	Pillar	3	Brick	White	Poor	3.8	Positive	
7/24	142	C21	Pipe horizontal	5	Metal	Grey	Poor	>9.9	Positive	
7/24	143	C21	Floor	6	Concrete	Grey	Poor	0.5		
7/24	144	R#	Door 1	1	Metal	Grey	Poor	1.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/24	145	C41	Door case	1	Metal	Grey	Poor	3.1	Positive	
7/24	146	C41	Wall	1	Concrete	Grey	Poor	0.4		
7/24	147	C41	Wall	2	Concrete	Grey	Poor	-0.1		
7/24	148	C41	Wall	3	Brick	Grey	Poor	-0.0		
7/24	149	RC41	Wall	4	Concrete	Grey	Poor	-0.1		
7/24	150	RC41	Beam	3	Metal	Grey	Poor	>9.9	Positive	
7/24	151	RC41	Pillar	3	Brick	Grey	Poor	0.1		
7/24	152	RC41	Horizontal pipe	5	Metal	Grey	Poor	>9.9	Positive	
7/24	153	RC41	Door 2	1	Metal	Grey	Poor	-0.1		
7/24	154	RC33E	Door	1	Metal	Grey	Fair	1.4	Positive	
7/24	155	RC33E	Door case	1	Metal	Grey	Fair	2.5	Positive	
7/24	156	RC33E	Wall	3	Brick	White	Poor	0.3		
7/24	157	RC33E	Pipe riser	3	Metal	White	Poor	1.4	Positive	
7/24	158	RC33E	Beam	5	Metal	Beige	Fair	>9.9	Positive	
7/24	159	RC33E	Ceiling	6	Concrete	White	Fair	-0.0		
7/25	1	Calibrate						1.9		
7/25	2	Calibrate						1.7	Avg. 1.8	
7/25	3	Calibrate						1.7		
7/25	4	Office 1	Door	1	Metal	Grey	Poor	0.0		
7/25	5	Basement	Door case	1	Metal	Grey	Poor	-0.1		
7/25	6	Basement	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/25	7	Basement	Wall	2	Plaster	Blue	Poor	>9.9	Positive	
7/25	8	Basement	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/25	9	Basement	Wall	4	Plaster	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	10	Basement	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/25	11	Basement	Partition	2	Wood	Blue	Poor	2.5	Positive	
7/25	12	Basement	Baseboard	2	Wood	Blue	Poor	0.4		
7/25	13	Basement	Radiator	2	Metal	Silver	Poor	0.1		
7/25	14	Basement	Radiator cover	2	Metal	Blue	Poor	0.5		
7/25	15	Basement	Window sill	2	Wood	Blue	Poor	2.4	Positive	
7/25	16	Basement	Window case	2	Wood	Blue	Poor	2.4	Positive	
7/25	17	Basement	Window apron	2	Wood	Blue	Poor	1.6	Positive	
7/25	18	Basement	Pipe	5	Metal	Beige	Poor	>9.9	Positive	
7/25	19	Basement	Partition	3	Wood	White	Poor	1.5	Positive	
7/25	20	Bay area	Wall	1	Brick	Beige	Poor	0.3		
7/25	21	By shelter	Wall	2	Brick	Grey	Poor	8.3	Positive	
7/25	22	By shelter	Wall	3	Brick	Beige	Poor	-0.0		
7/25	23	By shelter	Wall	4	Brick	White	Poor	>9.9	Positive	
7/25	24	By shelter	I-beams	6	Metal	White	Poor	>9.9	Positive	
7/25	25	By shelter	I-beams	6	Metal	Grey	Poor	>9.9	Positive	
7/25	26	By shelter	I-beams	6	Metal	White	Poor	>9.9	Positive	
7/25	27	By shelter	Stair tread	6	Concrete	Grey	Poor	0.0		
7/25	28	By shelter	Stair riser	6	Concrete	Grey	Poor	0.4		
7/25	29	By shelter	Stair tread	6	Wood	Grey	Poor	-0.0		
7/25	30	By shelter	Stair riser	6	Wood	Grey	Poor	0.3		
7/25	31	By shelter	Stair stringer	6	Wood	Grey	Poor	0.2		
7/25	32	By shelter	Column	6	Brick/Concrete	Grey	Poor	>9.9	Positive	
7/25	33	RB7	Door	1	Brick/Concrete	Grey	Poor	4.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	34	RB7	Door case	1	Brick/Concrete	Grey	Poor	5.1	Positive	
7/25	35	RB7	Wall	1	Brick	Grey	Poor	2.6	Positive	
7/25	36	RB7	Wall	2	Concrete	Grey	Poor	9.7	Positive	
7/25	37	RB7	Wall	2	Wood	Grey	Poor	0.0		
7/25	38	RB7	Wall	3	Brick	White	Poor	3.0	Positive	
7/25	39	RB7	Wall	4	Brick	Grey	Poor	4.1	Positive	
7/25	40	RB7	Pillar	3	Brick	Grey	Poor	3.1	Positive	
7/25	41	RB7	Beam	5	Metal	Grey	Poor	7.5	Positive	
7/25	42	RB7	Shelf	1	Wood	Grey	Poor	0.1		
7/25	43	RB7	Shelf support	1	Wood	Grey	Poor	2.8	Positive	
7/25	44	RB7	Floor	6	Concrete	Grey	Poor	1.0	Positive	
7/25	45	RB55	Door	1	Metal	Green	Poor	0.2		
7/25	46	RB55	Door case	1	Metal	Green	Poor	3.7	Positive	
7/25	47	RB55	Wall	1	Brick	White	Poor	-0.0		
7/25	48	RB55	Wall	2	Plaster	Grey	Poor	-0.1		
7/25	49	RB55	Wall	3	Plaster	Grey	Poor	-0.1		
7/25	50	RB55	Wall	4	Wood	Grey	Poor	2.3	Positive	
7/25	51	RB55	Beam	5	Metal	White	Poor	4.3	Positive	
7/25	52	RB55	Shelf	4	Wood	Grey	Poor	0.4		
7/25	53	RB55	Shelf	4	Wood	Grey	Poor	0.6		
7/25	54	B32	Door	1	Metal	Grey	Poor	4.5	Positive	
7/25	55	B32	Door case	1	Metal	Grey	Poor	5.5	Positive	
7/25	56	B32	Wall	1	Brick	Grey	Poor	0.7		
7/25	57	B32	Wall	2	Brick	Grey	Poor	3.7	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	58	B32	Wall	3	Brick	Grey	Poor	-0.0		
7/25	59	B32	Wall	4	Brick	Grey	Poor	4.7	Positive	
7/25	60	B32	Beam	5	Brick	Grey	Poor	6.2	Positive	
7/25	61	B32	Shelf	3	Wood	Grey	Poor	-0.1		
7/25	62	B32	Shelf support	3	Wood	Grey	Poor	0.0		
7/25	63	Balcony	Door	1	Wood	Grey	Poor	0.0		
7/25	64	Lecture hall	Door case	1	Metal	Grey	Poor	0.6		
7/25	65	Lecture hall	Wall	1	Concrete	Grey	Poor	-0.1		
7/25	66	Lecture hall	Wall	2	Concrete	Grey	Poor	0.3		
7/25	67	Lecture hall	Wall	4	Concrete	Grey	Poor	-0.1		
7/25	68	Lecture hall	Stair tread	1	Concrete	Grey	Poor	0.3		
7/25	69	Lecture hall	Stair riser	1	Concrete	Grey	Poor	-0.1		
7/25	70	Lecture hall	Hand rail	2	Metal	Grey	Poor	8.7	Positive	
7/25	71	Lecture hall	Floor	6	Concrete	Grey	Poor	-0.3		
7/25	72	RB13	Door	1	Metal	Green	Poor	0.4		
7/25	73	RB13	Door case	1	Metal	Green	Poor	0.3		
7/25	74	RB13	Wall	1	Brick	White	Poor	1.7	Positive	
7/25	75	RB13	Wall	2	Brick	Green	Poor	2.8	Positive	
7/25	76	RB13	Wall	3	Brick	Green	Poor	3.1	Positive	
7/25	77	RB13	Wall	4	Brick	Green	Poor	2.3	Positive	
7/25	78	RB13	Pipe riser	1	Metal	Green	Poor	2.1	Positive	
7/25	79	RB13	Radiator	3	Metal	Green	Poor	2.3	Positive	
7/25	80	RB13	Floor	6	Concrete	Green	Poor	1.7	Positive	
7/25	81	RB13	Cabinet door	3	Wood	Green	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	82	RB13	Cabinet door case	3	Wood	Green	Poor	0.2		
7/25	83	RB17	Door	1	Metal	Green	Poor	0.5		
7/25	84	RB17	Door case	1	Metal	Green	Poor	2.1	Positive	
7/25	85	RB17	Wall	1	Brick	Green	Poor	-0.1		
7/25	86	RB17	Wall	2	Brick	White	Poor	3.5	Positive	
7/25	87	RB17	Wall	3	Brick	Green	Poor	0.1		
7/25	88	RB17	Wall	4	Brick	White	Poor	0.2		
7/25	89	RB17	Column I-beam	6	Metal	White	Poor	>9.9	Positive	
7/25	90	RB17	Window sill	4	Wood	Green	Poor	0.1		
7/25	91	RB17	Window case	1	Wood	Green	Poor	0.1		
7/25	92	RB17	Window apron	1	Wood	Green	Poor	-0.0		
7/25	93	RB17	Window sash	1	Wood	Green	Poor	0.0		
7/25	94	RB17	Radiator	1	Metal	Silver	Poor	4.8	Positive	
7/25	95	RB17	Pipe riser	6	Metal	Grey	Poor	0.4		
7/25	96	RB17	Floor	6	Concrete	Grey	Poor	0.3		
7/25	97	RB20	Door	1	Metal	Grey	Poor	0.4		
7/25	98	RB20	Door case	1	Metal	Grey	Poor	>9.9	Positive	
7/25	99	RB20	Wall	1	Brick	White	Poor	>9.9	Positive	
7/25	100	RB20	Wall	2	Brick	Grey	Poor	>9.9	Positive	
7/25	101	RB20	Wall	3	Brick	White	Poor	>9.9	Positive	
7/25	102	RB20	Wall	4	Brick	Grey	Poor	>9.9	Positive	
7/25	103	RB20	I-beam	6	Metal	Grey	Poor	>9.9	Positive	
7/25	104	RB20	Shelf	2	Wood	Grey	Poor	0.2		
7/25	105	RB20	Shelf support	2	Wood	Grey	Poor	0.4		

Table
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	106	RB20	Floor	6	Concrete	Grey	Poor	0.5		
7/25	107	Bay #2	Wall	1	Plaster	Grey	Poor	0.0		
7/25	108	Bay #2	Wall	2	Brick	Grey	Poor	0.1		
7/25	109	Bay #2	Wall	3	Concrete	Grey	Poor	0.2		
7/25	110	Bay #2	Wall	4	Plaster	Grey	Poor	0.2		
7/25	111	Bay #2	I-beam	6	Metal	Grey	Poor	-0.1		
7/25	112	Bay #2	Pipe riser	3	Metal	Grey	Poor	2.9	Positive	
7/25	113	Bay #2	Radiator	3	Metal	Grey	Poor	0.1		
7/25	114	Gym	Door	1	Metal	Grey	Poor	2.1	Positive	
7/25	115	Gym	Door case	1	Metal	Grey	Poor	>9.9	Positive	
7/25	116	Gym	Wall	1	Brick	White	Poor	>9.9	Positive	
7/25	117	Gym	Wall	2	Brick	White	Poor	>9.9	Positive	
7/25	118	Gym	Wall	3	Concrete	White	Poor	>9.9	Positive	
7/25	119	Gym	Wall	4	Brick	White	Poor	>9.9	Positive	
7/25	120	Gym	I-beam	6	Metal	White	Poor	>9.9	Positive	
7/25	121	Gym	Pipe riser	3	Metal	White	Poor	0.6		
7/25	122	Gym	Hand rail	1	Metal	White	Poor	1.9	Positive	
7/25	123	Gym	Stair tread	1	Metal	White	Poor	3.5	Positive	
7/25	124	Gym	Newel post	1	Metal	White	Poor	>9.9	Positive	
7/25	125	Gym	Stringer	1	Metal	White	Poor	>9.9	Positive	
7/25	126	RB12	Door	1	Metal	Beige	Poor	0.2		
7/25	127	RB12	Door case	1	Metal	Beige	Poor	2.3	Positive	
7/25	128	RB12	Wall	1	Brick	White	Poor	>9.9	Positive	
7/25	129	RB12	Wall	2	Brick	White	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/25	130	RB12	Wall	4	Brick	White	Poor	>9.9	Positive	
7/25	131	RB12	Radiator	1	Metal	White	Poor	0.2		
7/25	132	RB12	Grate column	2	Concrete	White	Poor	0.0		
7/25	133	RB12	Guard rail	3	Metal	White	Poor	3.9	Positive	
7/25	134	RB12	Found floor	6	Concrete	Grey	Poor	0.5		
7/25	135	Gym	Door	1	Wood	Brown	Poor	0.3		
7/25	136	Office	Door case	1	Wood	Brown	Poor	0.1		
7/25	137	Area #2	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/25	138	Area #2	Wall	2	Plaster	Blue	Poor	>9.9	Positive	
7/25	139	Area #2	Wall	3	Plaster	Blue	Poor	>9.9	Positive	
7/25	140	Area #2	Wall	4	Plaster	Blue	Poor	>9.9	Positive	
7/25	141	Area #2	Pipe riser	2	Plaster	White	Poor	>9.9	Positive	
7/25	142	Area #2	Pillar	2	Metal	Blue	Poor	>9.9	Positive	
7/25	143	Area #2	Window case	4	Wood	Red	Poor	7.8	Positive	
7/25	144	Area #2	Window apron	4	Wood	Red	Poor	6.5	Positive	
7/25	145	Gym	Wall	1	Brick	White	Poor	0.3		
7/25	146	Foyer area	Wall	2	Brick	Grey	Poor	-0.0		
7/25	147	Foyer area	Wall	3	Brick	White	Poor	-0.1		
7/25	148	Foyer area	Wall	4	Brick	Grey	Poor	-0.0		
7/26	149	Gym	Greate column	2	Concrete	Grey	Poor	>9.9	Positive	
7/26	150	Foyer	I-beam	6	Metal	White	Poor	>9.9	Positive	
7/26	151	Firing range	Door	1	Metal	Beige	Poor	0.3		
7/26	152	Firing range	Door case	1	Metal	Beige	Poor	3.3	Positive	
7/26	153	Firing range	Wall	1	Brick	White	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	154	Firing range	Wall	2	Brick	Brown	Poor	0.1	Negative	
7/26	155	Firing range	Wall	3	Metal	White	Poor	1.8	Positive	
7/26	156	Firing range	Wall	4	Brick	Brown	Poor	-0.0		
7/26	157	Firing range	Duct	5	Metal	Beige	Poor	0.2		
7/26	158	Firing range	Horizontal pipe	5	Metal	Beige	Poor	-0.2		
7/26	159	Firing range	Partition wall	6	Brick	Beige	Poor	0.2		
7/26	160	Firing range	I-beam	6	Metal	Beige	Poor	-0.1		
7/26	161	Firing range	Beam	5	Metal	Beige	Poor	1.5	Positive	
7/26	162	Firing range	Gate	2	Metal	Grey	Poor	-0.1		
7/26	163	Firing range	Compressor	2	Metal	Green	Poor	0.6		
7/26	164	Firing range	Ceiling	5	Concrete	Beige	Fair	-0.0		
7/26	165	Calibrate						1.8		
7/26	166	Calibrate						1.7	Avg. 1.8	
7/26	167	Calibrate						1.8		
7/26	168	Calibrate						1.7		
7/26	169	Calibrate						1.6	Avg. 1.8	
7/26	170	Calibrate						1.7		
7/26	171	Basement	Wall	1	Plaster	Grey/blue	Poor	>9.9	Positive	
7/26	172	Lobby	Wall	2	Plaster	Grey/blue	Poor	0.1		
7/26	173	Mezzanine Area	Wall	3	Plaster	Grey/blue	Poor	>9.9	Positive	
7/26	174	Mezzanine Area	Wall	4	Plaster	Grey/grey	Poor	-0.0		
7/26	175	Mezzanine Area	Ceiling	5	Plaster	Grey/blue	Poor	>9.9	Positive	
7/26	176	Mezzanine Area	Pipe riser	4	Metal	Grey/blue	Poor	>9.9	Positive	
7/26	177	Mezzanine Area	Horizontal pipe	5	Metal	Grey/blue	Poor	1.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	178	Mezzanine Area	Column	6	Plaster	Grey/grey	Poor	>9.9	Positive	
7/26	179	Mezzanine Area	Baseboard	3	Wood	Grey/grey	Poor	1.5	Positive	
7/26	180	Mezzanine Area	Door	1	Wood	Grey/green	Poor	1.6	Positive	
7/26	181	Mezzanine Area	Door case	1	Wood	Grey/green	Poor	1.5	Positive	
7/26	182	Mezzanine Area	Floor	6	Concrete	Grey/grey	Poor	2.1	Positive	
7/26	183	Mezzanine Area	Hand rail	2	Metal	Grey/grey	Poor	7.8	Positive	
7/26	184	Mezzanine Area	Newel post	2	Metal	Grey/grey	Poor	7.6	Positive	
7/26	185	Mezzanine Area	Stair tread	2	Metal	Grey/grey	Poor	3.3	Positive	
7/26	186	Basement	Stair riser	6	Metal	Grey	Poor	5.5	Positive	
7/26	187	Mezzanine lobby	stringer	6	Metal	Grey	Poor	8.0	Positive	
7/26	188	Mezzanine lobby	Beam	1	Metal	Grey	Poor	>9.9	Positive	
7/26	189	RA1	Door	1	Wood	Brown	Poor	0.1		
7/26	190	RA1	Door case	1	Wood	Grey	Poor	1.3	Positive	
7/26	191	RA1	Wall	1	Plaster	Green	Poor	>9.9	Positive	
7/26	192	RA1	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/26	193	RA1	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/26	194	RA1	Wall	4	Plaster	Green	Poor	9.5	Positive	
7/26	195	RA1	Column	6	Plaster	Green	Poor	>9.9	Positive	
7/26	195	RA1	Baseboard	1	Wood	Grey	Poor	-0.1		
7/26	196	RA1	Radiator	3	Metal	Beige	Poor	0.1		
7/26	197	RA1	Window sill	3	Wood	Green	Poor	0.1		
7/26	198	RA1	Window case	3	Wood	Green	Poor	0.0		
7/26	199	RA1	Window apron	3	Wood	Green	Poor	0.0		
7/26	200	RA1	Window sash	3	Wood	Green	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	201	RA1	Beam	5	Plaster	Green	Poor	>9.9	Positive	
7/26	202	RA1	Ceiling	5	Plaster	Green	Poor	>9.9	Positive	
7/26	203	Bsmnt, Staircase A	Door	1	Metal	Green	Poor	1.8	Positive	
7/26	204	Bsmnt, Staircase A	Door case	1	Metal	Green	Poor	1.6	Positive	
7/26	205	Bsmnt, Staircase A	Wall	1	Plaster	Green	Poor	0.1		
7/26	206	Bsmnt, Staircase A	Wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/26	207	Bsmnt, Staircase A	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/26	208	Bsmnt, Staircase A	Wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/26	209	Bsmnt, Staircase A	Radiator cover	2	Metal	Grey	Poor	0.3		
7/26	210	Bsmnt, Staircase A	Radiator	2	Metal	Grey	Poor	1.7	Positive	
7/26	211	Bsmnt, Staircase A	Baseboard	4	Plaster	Grey	Poor	6.6	Positive	
7/26	212	Bsmnt, Staircase A	Ceiling	5	Plaster	Green	Poor	>9.9	Positive	
7/26	213	Bsmnt, Staircase A	Floor	6	Concrete	Grey	Poor	1.0	Positive	
7/26	214	Mezzanine	Wall	1	Brick	White	Poor	3.6	Positive	
7/26	215	Bsmnt, Staircase B	Wall	2	Brick	Grey	Poor	3.9	Positive	
7/26	216	Bsmnt, Staircase B	Wall	3	Brick	White	Poor	2.5	Positive	
7/26	217	Bsmnt, Staircase B	Wall	4	Brick	Grey	Poor	3.9	Positive	
7/26	218	Bsmnt, Staircase B	Hand rail	4	Metal	Grey	Poor	1.6	Positive	
7/26	219	Bsmnt, Staircase B	Stair tread	4	Concrete	Grey	Poor	0		
7/26	220	Bsmnt, Staircase B	Stair riser	4	Concrete	Grey	Poor	0.1		
7/26	221	Bsmnt, Staircase B	Stringer	4	Concrete	Grey	Poor	0.1		
7/26	222	Bsmt, mezzanine staircase B	Floor	6	Concrete	Grey	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	223	Bsmt, mezzanine staircase B	Radiator cover	3	Metal	Grey	Poor	0.2		
7/26	224	Bsmt, mezzanine staircase B	Radiator	3	Metal	Grey	Poor	0.5		
7/26	225	RC'6	Door	1	Metal	Green	Poor	-0.1		
7/26	226	RC'6	Door case	1	Metal	Green	Poor	0.6		
7/26	227	RC'6	Wall	1	Brick	White	Poor	3.7	Positive	
7/26	228	RC'6	Wall	2	Brick	White	Poor	4.1	Positive	
7/26	229	RC'6	Wall	3	Brick	White	Poor	-0.2		
7/26	230	RC'6	Wall	4	Brick	White	Poor	4.8	Positive	
7/26	231	RC'6	Hand rail	6	Metal	Grey	Poor	-0.1		
7/26	232	RC'6	Newel post	6	Metal	Grey	Poor	1.4	Positive	
7/26	233	RC'6	Stair tread	6	Wood	Grey	Poor	-0.1		
7/26	234	RC'6	Stringer	6	Metal	Grey	Poor	0.2		
7/26	235	RC'6	Locker door	2	Metal	Grey	Poor	0.5		
7/26	236	RC'6	Beam	5	Metal	Grey	Poor	6.4	Positive	
7/26	237	RC'6	Floor	6	Wood	Grey	Poor	0.3		
7/26	238	RC'6	Floor	6	Concrete	Grey	Poor	3.4	Positive	
7/26	239	RC16A	Door	1	Wood	Stained	Poor	-0.1		
7/26	240	RC16A	Door case	1	Wood	Red	Poor	3.9	Positive	
7/26	241	RC16A	Wall	1	Brick	Blue	Poor	>9.9	Positive	
7/26	242	RC16A	Wall	2	Brick	Green	Poor	>9.9	Positive	
7/26	243	RC16A	Wall	3	Concrete	Beige	Poor	2.8	Positive	
7/26	244	RC16A	Wall	4	Brick	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	245	RC16A	Pipe riser	3	Metal	Blue	Poor	1.8	Positive	
7/26	246	RC16A	Duct	5	Metal	Blue	Poor	0.2		
7/26	247	RC14	Door	1	Metal	Green	Poor	-0.0		
7/26	248	RC14	Door case	1	Metal	Green	Poor	2.4	Positive	
7/26	249	RC14	Wall	1	Brick	Blue	Poor	3.5	Positive	
7/26	250	RC14	Wall	2	Brick	Blue	Poor	3.2	Positive	
7/26	251	RC14	Wall	3	Brick	Blue	Poor	4.1	Positive	
7/26	252	RC14	Wall	4	Brick	Blue	Poor	4.0	Positive	
7/26	253	RC14	Hand rail	6	Metal	Grey	Poor	0.5		
7/26	254	RC14	Newel post	6	Metal	Grey	Poor	0.2		
7/26	255	RC14	Stair tread	6	Wood	Grey	Poor	0.1		
7/26	256	RC14	Stringer	6	Metal	Grey	Poor	0.2		
7/26	257	RC14	Locker door	2	Metal	Blue	Poor	0.4		
7/26	258	RC14	Beam	5	Metal	Grey	Poor	3.6	Positive	
7/26	259	RC14A	Door	1	Wood	Blue	Poor	0.4		
7/26	260	RC14A	Door case	1	Wood	Blue	Poor	0.3		
7/26	261	RC14A	Wall	1	Brick	White	Poor	6.7	Positive	
7/26	262	RC14A	Wall	2	Brick	White	Poor	>9.9	Positive	
7/26	263	RC14A	Wall	3	Concrete	White	Poor	4.8	Positive	
7/26	264	RC14A	Wall	4	Brick	White	Poor	>9.9	Positive	
7/26	265	RC14A	Pipe riser	3	Metal	White	Poor	0.3		
7/26	266	RC14A	Duct	5	Metal	White	Poor	0.1		
7/26	267	R1-15	Door	1	Metal	Green	Poor	0.2		
7/26	268	R1-15	Door case	1	Metal	Green	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	269	R1-15	Wall	1	Plaster	Beige	Poor	-0.1		
7/26	270	R1-15	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/26	271	R1-15	Wall	3	Plaster	Beige	Poor	4.6	Positive	
7/26	272	R1-15	Wall	4	Plaster	Beige	Poor	3.4	Positive	
7/26	273	R1-15	Baseboard	2	Wood	Grey	Poor	-0.1		
7/26	274	R1-15	Chair rail	4	Wood	Beige	Poor	0.6		
7/26	275	R1-15	Wall molding	3	Wood	Beige	Poor	0.5		
7/26	276	R1-15	Radiator cover	2	Metal	White	Poor	9.1	Positive	
7/26	277	R1-15	Window sill	3	Wood	White	Poor	0.3		
7/26	278	R1-15	Window case	3	Wood	White	Poor	0.3		
7/26	279	R1-15	Window apron	3	Wood	White	Poor	0.3		
7/26	280	R1-15	Partition wall		Wood	Beige	Poor	-0.0		
7/26	281	R1-15	Ceiling	5	Plaster	Blue	Poor	5.3	Positive	
7/26	282	R1-15-A	Locker door	2	Metal	Grey	Poor	1.7	Positive	
7/26	283	R1-15-A	Door	1	Wood	Grey	Poor	3.4	Positive	
7/26	284	R1-15-A	Door case	1	Wood	Grey	Poor	0.4		
7/26	285	R1-15-A	Wall	1	Plaster	Blue	Poor	4.5	Positive	
7/26	286	R1-15-A	Wall	2	Plaster	Blue	Poor	3.8	Positive	
7/26	287	R1-15-A	Wall	3	Plaster	Blue	Poor	5.4	Positive	
7/26	288	R1-15-A	Wall	4	Plaster	Blue	Poor	1.2	Positive	
7/26	289	R1-15-A	Baseboard	2	Wood	Blue	Poor	0.8		
7/26	290	R1-15-A	Chair rail	3	Wood	Blue	Poor	2.5	Positive	
7/26	291	R1-15-A	Ceiling	5	Plaster	Blue	Poor	3.5	Positive	
7/26	292	R1-15-A	Horizontal pipe	5	Metal	Blue	Poor	0.5		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	293	RM1-15	Door	1	Wood	Green	Poor	1.5	Positive	
7/26	294	RM1-15	Door case	1	Wood	Green	Poor	2.1	Positive	
7/26	295	RM1-15	Wall	1	Concrete	White	Poor	2.4	Positive	
7/26	296	RM1-15	Wall	2	Concrete	White	Poor	2.9	Positive	
7/26	297	RM1-15	Wall	3	Concrete	White	Poor	0.2		
7/26	298	RM1-15	Wall	4	Concrete	Peach	Poor	3.3	Positive	
7/26	299	RM1-15	Baseboard	3	Wood	White	Poor	2.5	Positive	
7/26	300	RM1-15	Chair rail	2	Wood	White	Poor	2.2	Positive	
7/26	301	RM1-15	Radiator cover	2	Metal	White	Poor	0.3		
7/26	302	RM1-15	Radiator	2	Metal	White	Poor	0.1		
7/26	303	RM1-15	Window sill	3	Wood	White	Poor	2.2	Positive	
7/26	304	RM1-15	Window case	3	Wood	White	Poor	1.9	Positive	
7/26	305	RM1-15	Window sash	3	Wood	White	Poor	3.1	Positive	
7/26	306	RM1-15	Ceiling	5	Plaster	White	Poor	0.5		
7/26	307	RM1-15	Door	1	Wood	Beige	Poor	1.7	Positive	
7/26	308	RM1-15/Bath	Door case	1	Wood	Beige	Poor	5.2	Positive	
7/26	309	RM1-15/Bath	Wall	1	Plaster	Beige	Poor	4.9	Positive	
7/26	310	RM1-15/Bath	Wall	2	Plaster	Beige	Poor	4.5	Positive	
7/26	311	RM1-15/Bath	Wall	3	Plaster	Beige	Poor	4.7	Positive	
7/26	312	RM1-15/Bath	Wall	4	Plaster	Beige	Poor	0.4		
7/26	313	RM1-15/Bath	Radiator	1	Metal	Beige	Poor	0.7		
7/26	314	RM1-15/Bath	Cabinet door	3	Metal	Beige	Poor	7.3	Positive	
7/26	315	RM1-15/Bath	Horizontal pipe	5	Metal	Beige	Poor	0.5		
7/26	316	RM1-15/Bath	Window sill	4	Wood	Beige	Poor	3.5	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	317	RM1-15/Bath	Window case	4	Wood	Beige	Poor	2.8	Positive	
7/26	318	RM1-15/Bath	Window frame	4	Wood	Beige	Poor	2.8	Positive	
7/26	319	RM1-15/Bath	Ceiling	5	Plaster	Beige	Poor	3.8	Positive	
7/26	320	R1-12	Door	1	Metal	Green	Poor	0.2		
7/26	321	R1-12	Door case	1	Metal	Green	Poor	0.1		
7/26	322	R1-12	Wall	1	Plaster	Beige	Poor	5.0	Positive	
7/26	323	R1-12	Wall	2	Plaster	Beige	Poor	4.9	Positive	
7/26	324	R1-12	Wall	3	Plaster	Beige	Poor	6.3	Positive	
7/26	325	R1-12	Wall	4	Plaster	Beige	Poor	5.0	Positive	
7/26	326	R1-12	Baseboard	4	Wood	Grey	Poor	0.6		
7/26	327	R1-12	Wall molding	2	Wood	Grey	Poor	0.7		
7/26	328	R1-12	Radiator cover	2	Metal	Grey	Poor	1.6	Positive	
7/26	329	R1-12	Radiator	2	Metal	Black	Poor	0.6		
7/26	330	R1-12	Window sill	3	Wood	Grey	Poor	1.0	Positive	
7/26	331	R1-12	Window case	3	Wood	Grey	Poor	0.7		
7/26	332	R1-12	Window apron	3	Wood	Grey	Poor	0.2		
7/26	333	R1-12A	Door	1	Wood	Grey	Poor	2.3	Positive	
7/26	334	R1-12A	Door case	1	Wood	Grey	Poor	2.1	Positive	
7/26	335	R1-12A	Wall	1	Plaster	Beige	Poor	6.8	Positive	
7/26	336	R1-12A	Wall	2	Plaster	Beige	Poor	8.3	Positive	
7/26	337	R1-12A	Wall	3	Plaster	Beige	Poor	8.4	Positive	
7/26	338	R1-12A	Wall	4	Plaster	Beige	Poor	5.8	Positive	
7/26	339	R1-12A	Baseboard	1	Wood	Beige	Poor	7.3	Positive	
7/26	340	R1-12A	Pipe riser	2	Metal	Beige	Poor	7.9	Positive	

Tab.. 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	341	R1-12A	Window case	4	Wood	Beige	Poor	0.6		
7/26	342	R1-12A	Window sash	4	Wood	Beige	Poor	2.5	Positive	
7/26	343	R1-12A	Ceiling	5	Plaster	Beige	Poor	3.2	Positive	
7/26	344	R1-12A	Shelf support	2	Wood	Beige	Poor	0.0		
7/26	345	Calibrate						1.9		
7/26	346	Calibrate						1.8	Avg. 1.9	
7/26	347	Calibrate						1.9		
7/26	348	R1-1	Door	1	Metal	Green	Poor	0.2		
7/26	349	R1-1	Door case	1	Metal	Green	Poor	-0.0		
7/26	350	R1-1	Wall	1	Plaster	Beige	Poor	1.0	Positive	
7/26	351	R1-1	Wall	2	Plaster	Beige	Poor	3.4	Positive	
7/26	352	R1-1	Wall	3	Plaster	Beige	Poor	3.4	Positive	
7/26	353	R1-1	Wall	4	Plaster	Beige	Poor	4.3	Positive	
7/26	354	R1-1	Baseboard	2	Wood	Black	Poor	0.5		
7/26	355	R1-1	Wall molding	3	Wood	Beige	Poor	1.0	Positive	
7/26	356	R1-1	Radiator	2	Metal	Beige	Poor	1.5		
7/26	357	R1-1	Window sill	3	Wood	Beige	Poor	0.2		
7/26	358	R1-1	Window case	3	Wood	Beige	Poor	-0.1		
7/26	359	R1-1	Window sash	3	Wood	Beige	Poor	0.2		
7/26	360	R1-1	Ceiling	5	Plaster	Beige	Poor	0.2		
7/26	361	R1-1A	Door	1	Wood	Varnish	Poor	0.1		
7/26	362	R1-1A	Door case	1	Wood	Varnish	Poor	1.0	Positive	
7/26	363	R1-1A	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/26	364	R1-1A	Wall	2	Plaster	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	365	R1-1A	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/26	366	R1-1A	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/26	367	R1-1A	Baseboard	3	Wood	Black	Poor	0.3		
7/26	368	R1-1A	Pipe riser	1	Metal	Beige	Poor	3.6	Positive	
7/26	369	R1-1A	Ceiling	5	Plaster	Beige	Poor	5.1	Positive	
7/26	370	RM1-1	Door	1	Wood	White	Poor	-0.1		
7/26	371	RM1-1	Door case	1	Wood	Green	Poor	-0.1		
7/26	372	RM1-1	Wall	1	Plaster	Beige	Poor	9.5	Positive	
7/26	373	RM1-1	Wall	2	Plaster	Beige	Poor	8.9	Positive	
7/26	374	RM1-1	Wall	3	Plaster	Beige	Poor	8.0	Positive	
7/26	375	RM1-1	Wall	4	Plaster	Beige	Poor	6.8	Positive	
7/26	376	RM1-1	Baseboard	4	Wood	Beige	Poor	1.4	Positive	
7/26	377	RM1-1	Window sill	3	Wood	Green	Poor	0.2		
7/26	378	RM1-1	Window case	3	Wood	Green	Poor	1.0	Positive	
7/26	379	RM1-1	Window sash	3	Wood	Varnish	Poor	5.2	Positive	
7/26	380	RM1-1	Radiator	2	Metal	Green	Poor	0.5		
7/26	381	RM1-1	Ceiling	5	Plaster	Beige	Poor	3.7	Positive	
7/26	382	RM1-1	Pipe riser	1	Metal	Beige	Poor	0.7		
7/26	383	RM1-1	Door	1	Wood	White	Poor	5.9	Positive	
7/26	384	RM1-1/Bath	Door case	1	Wood	Green	Poor	5.2	Positive	
7/26	385	RM1-1/Bath	Wall	1	Plaster	Beige	Poor	9.4	Positive	
7/26	386	RM1-1/Bath	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/26	387	RM1-1/Bath	Wall	3	Plaster	Beige	Poor	9.1	Positive	
7/26	388	RM1-1/Bath	Wall	4	Plaster	Beige	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	389	RM1-1/Bath	Radiator	1	Metal	So;ver	Poor	-0.0		
7/26	390	RM1-1/Bath	Cabinet door	3	Metal	Beige	Poor	>9.9	Positive	
7/26	391	RM1-1/Bath	Pipe riser	4	Metal	Black	Poor	1.4	Positive	
7/26	392	RM1-1/Bath	Ceiling	5	Plaster	Beige	Poor	2.2	Positive	
7/26	393	R1-4	Door	1	Metal	Green	Poor	-0.0		
7/26	394	R1-4	Door case	1	Metal	Green	Poor	-0.1		
7/26	395	R1-4	Wall	1	Plaster	Green	Poor	1.6	Positive	
7/26	396	R1-4	Wall	2	Plaster	Beige	Poor	5.0	Positive	
7/26	397	R1-4	Wall	3	Plaster	Beige	Poor	4.6	Positive	
7/26	398	R1-4	Wall	4	Plaster	Beige	Poor	4.1	Positive	
7/26	399	R1-4	Wall	2	Plaster	White	Poor	4.1	Positive	
7/26	400	R1-4	Radiator cover	2	Metal	Silver	Poor	0.4		
7/26	401	R1-4	Radiator	2	Metal	Silver	Poor	0.5		
7/26	402	R1-4	Window sill	3	mw	Black	Poor	2.1	Positive	
7/26	403	R1-4	Window case	3	Wood	Black	Poor	0.1		
7/26	404	R1-4	Window apron	3	Wood	Black	Poor	1.7	Positive	
7/26	405	R1-4	Baseboard	2	Wood	Black	Poor	0.4		
7/26	406	R1-4	Ceiling	5	Plaster	Beige	Poor	0.0		
7/26	407	R1-4B	Door	1	Wood	White	Poor	1.0	Positive	
7/26	408	R1-4B	Door case	1	Wood	White	Poor	1.0	Positive	
7/26	409	R1-4B	Wall	1	Plaster	White	Poor	1.0	Positive	
7/26	410	R1-4B	Wall	2	Plaster	White	Poor	0.3		
7/26	411	R1-4B	Wall	3	Plaster	White	Poor	1.6	Positive	
7/26	412	R1-4B	Wall	4	Plaster	White	Poor	1.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	413	R1-4B	Baseboard	3	Wood	White	Poor	1.0	Positive	
7/26	414	R1-4B	Window sill	2	Wood	White	Poor	0.5		
7/26	415	R1-4B	Window case	2	Wood	White	Poor	0.5		
7/26	416	R1-4B	Window sash	2	Wood	White	Poor	0.5		
7/26	417	R1-4B	Ceiling	5	Plaster	White	Poor	0.6		
7/26	418	R1-4A	Door	1	Wood	Brown	Poor	1.3	Positive	
7/26	419	R1-4A	Door case	1	Wood	Green	Poor	1.0	Positive	
7/26	420	R1-4A	Wall	1	Plaster	Red	Poor	1.6	Positive	
7/26	421	R1-4A	Wall	2	Plaster	Red	Poor	2.0	Positive	
7/26	422	R1-4A	Wall	3	Plaster	Red	Poor	2.1	Positive	
7/26	423	R1-4A	Wall	4	Plaster	Red	Poor	0.1		
7/26	424	R1-4A	Baseboard	3	Wood	Red	Poor	2.0	Positive	
7/26	425	R1-4A	Chair rail	2	Wood	Red	Poor	0.6		
7/26	426	R1-4A	Window case	4	Wood	Brown	Poor	0.6		
7/26	427	R1-4A	Window sash	4	Wood	Brown	Poor	0.6		
7/26	428	R1-4A	Horizontal pipe	5	Metal	White	Poor	1.5	Positive	
7/26	429	R1-4A	Ceiling	5	Plaster	White	Poor	0.4		
7/26	430	R1-9	Door	1	Wood	Beige	Poor	0.2		
7/26	431	Ladies room	Door case	1	Wood	Green	Poor	0.0		
7/26	432	Ladies room	Wall	1	Concrete	Beige	Poor	-0.0		
7/26	433	Ladies room	Wall	2	Concrete	Beige	Poor	0.3		
7/26	434	Ladies room	Wall	3	Concrete	Beige	Poor	0.0		
7/26	435	Ladies room	Wall	4	Concrete	Beige	Poor	0.0		
7/26	436	Ladies room	Radiator	3	Metal	Beige	Poor	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/26	437	Ladies room	Door case	3	Metal	Beige	Poor	-0.0		
7/26	438	Ladies room	Radiator cover	1	Metal	Beige	Poor	-0.1		
7/26	439	Ladies room	Pipe riser	3	Metal	Beige	Poor	6.8	Positive	
7/26	440	Ladies room	Wall	3	Brick	Beige	Poor	-0.0		
7/26	441	Calibrate						1.9		
7/26	442	Calibrate						1.8	Avg 1.9	
7/26	443	Calibrate						1.8		
7/27	444	Calibrate						1.8		
7/27	445	Calibrate						1.8		
7/27	446	Calibrate						1.8		
7/27	447	East tower office	Door	1	Wood	Brown	Poor	0.1		
7/27	448	East tower office	Door case	1	Wood	Brown	Poor	0.1		
7/27	449	East tower office	Upper wall	1	Plaster	Lylac	Poor	>9.9	Positive	
7/27	450	East tower office	Upper wall	2	Plaster	Lylac	Poor	>9.9	Positive	
7/27	451	East tower office	Upper wall	3	Plaster	Lylac	Poor	>9.9	Positive	
7/27	452	East tower office	Upper wall	4	Plaster	Lylac	Poor	>9.9	Positive	
7/27	453	East tower office	Lower wall	1	Plaster	Brown	Poor	>9.9	Positive	
7/27	454	East tower office	Lower wall	2	Plaster	Brown	Poor	>9.9	Positive	
7/27	455	East tower office	Lower wall	3	Plaster	Brown	Poor	>9.9	Positive	
7/27	456	East tower office	Lower wall	4	Plaster	Brown	Poor	>9.9	Positive	
7/27	457	East tower office	Baseboard	3	Wood	Brown	Poor	3.2	Positive	
7/27	458	East tower office	Chair rail	2	Wood	Brown	Poor	0.1		
7/27	459	East tower office	Radiator cover	2	Metal	Brown	Poor	>9.9	Positive	
7/27	460	East tower office	Radiator	2	Metal	Brown	Poor	0.2		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	461	East tower office	Horizontal pipe	3	Metal	Brown	Poor	0.2		
7/27	462	East tower office	Window sill	3	Wood	Brown	Poor	0.3		
7/27	463	East tower office	Window case	3	Wood	Brown	Poor	0.2		
7/27	464	East tower office	Window apron	3	Wood	Brown	Poor	0.0		
7/27	465	East tower office	Ceiling	5	Plaster	White	Poor	5.7	Positive	
7/27	466	Corridor to east tower office	Door	1	Wood	Varnish	Poor	0.0		
7/27	467	Corridor to east tower office	Door case	1	Wood	Blue	Poor	0.6		
7/27	468	Corridor to east tower office	Wall	1	Brick	Blue	Poor	-0.1		
7/27	469	Corridor to east tower office	Wall	2	Brick	White	Poor	-0.0		
7/27	470	Corridor to east tower office	Wall	3	Brick	Blue	Poor	0.0		
7/27	471	Corridor to east tower office	Wall	4	Brick	Blue	Poor	-0.0		
7/27	472	Corridor to east tower office	Pipe riser	2	Metal	Blue	Poor	0.6		
7/27	473	Corridor to east tower office	Shelf	3	Wood	Blue	Poor	3.8	Positive	
7/27	474	Corridor to east tower office	Shelf support	2	Wood	Blue	Poor	3.8	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	475	Corridor to east tower office	Window sill	4	Wood	Black	Poor	0.4		
7/27	476	Corridor to east tower office	Window case	4	Wood	Black	Poor	-0.1		
7/27	477	Corridor to east tower office	Window apron	4	Wood	Black	Poor	0.2		
7/27	478	Corridor to east tower office	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/27	479	Corridor to east tower office	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/27	480	Corridor to east tower office	Wall	4	Plaster	Green	Poor	>9.9	Positive	
7/27	481	Corridor to east tower office	Baseboard	4	Wood	Grey	Poor	4.2	Positive	
7/27	482	Corridor to east tower office	Ceiling	5	Plaster	Grey	Poor	>9.9	Positive	
7/27	483	West tower office	Door	1	Wood	Black	Poor	0.2		
7/27	484	West tower office	Door case	1	Wood	Black	Poor	5.2	Positive	
7/27	485	West tower office	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	486	West tower office	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	487	West tower office	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	488	West tower office	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	489	West tower office	Baseboard	2	Wood	Black	Poor	2.4	Positive	
7/27	490	West tower office	Radiator cover	4	Wood	Black	Poor	0.3		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	491	West tower office	Radiator	1	Metal	Silver	Poor	2.0	Positive	
7/27	492	West tower office	Window sill	1	Wood	Beige	Poor	3.1	Positive	
7/27	493	West tower office	Window case	1	Wood	Beige	Poor	2.1	Positive	
7/27	494	West tower office	Window sash	1	Wood	Beige	Poor	2.6	Positive	
7/27	495	West tower office	Window apron	1	Wood	Beige	Poor	2.7	Positive	
7/27	496	West tower office	Wall molding	1	Wood	Beige	Poor	>9.9	Positive	
7/27	497	Office	Door	1	Wood	Grey	Poor	>9.9	Positive	
7/27	498	Office/Bath	Door case	1	Wood	Black	Poor	>9.9	Positive	
7/27	499	Main lobby	Wall	1	Concrete	Beige	Fair	>9.9	Positive	
7/27	500	Main lobby	Wall	2	Concrete	Beige	Fair	>9.9	Positive	
7/27	501	Main lobby	Wall	3	Concrete	Beige	Fair	>9.9	Positive	
7/27	502	Main lobby	Wall	4	Concrete	Beige	Fair	>9.9	Positive	
7/27	503	Main lobby	Column	6	Concrete	Beige	Fair	>9.9	Positive	
7/27	504	Main lobby	Door	1	Metal	Grey	Fair	0.2		
7/27	505	Main lobby	Door case	1	Metal	Grey	Fair	-0.1		
7/27	506	Main lobby	Baseboard	3	Concrete	Grey	Fair	0.7		
7/27	507	Main lobby	Radiator cover	3	Metal	Black	Fair	-0.1		
7/27	508	Main lobby	Radiator	3	Metal	Silver	Fair	0.6		
7/27	509	Main lobby	Window case	3	Wood	Black	Fair	0.0		
7/27	510	Main lobby	Window sash	3	Wood	Black	Fair	-0.1		
7/27	511	Main lobby	Gate	4	Metal	Grey	Fair	>9.9	Positive	
7/27	512	Main lobby	Ceiling	5	Concrete	Beige	Fair	0.1		
7/27	513	Lobby	Column	6	Concrete	White	Fair	>9.9	Positive	
7/27	514	2nd floor corridor	Door	3	Wood	Stained	Fair	-0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	515	2nd floor corridor	Door case	3	Wood	Stained	Fair	0.2		
7/27	516	2nd floor corridor	Gate	1	Metal	Grey	Poor	0.4		
7/27	517	2nd floor corridor	Gate case	1	Metal	Grey	Poor	-0.1		
7/27	518	2nd floor corridor	Upper wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	519	2nd floor corridor	Upper wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	520	2nd floor corridor	Lower wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/27	521	2nd floor corridor	Lower wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/27	522	2nd floor corridor	Upper wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	523	2nd floor corridor	Upper wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	524	2nd floor corridor	Lower wall	1	Plaster	Grey	Poor	>9.9	Positive	
7/27	525	2nd floor corridor	Lower wall	3	Plaster	Grey	Poor	>9.9	Positive	
7/27	526	2nd floor corridor	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	527	2nd floor corridor	Radiator cover	2	Metal	Grey	Poor	0.3		
7/27	528	2nd floor corridor	Radiator	2	Metal	Silver	Poor	0.3		
7/27	529	2nd floor corridor	Pipe riser	2	Metal	Silver	Poor	0.2		
7/27	530	2nd floor corridor	Baseboard	4	Concrete	Grey	Poor	1.7	Positive	
7/27	531	East officers club	Door	1	Wood	Stained	Fair	-0.2		
7/27	532	East officers club	Door case	1	Wood	Stained	Fair	-0.1		
7/27	533	East officers club	Upper wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	534	East officers club	Upper wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	535	East officers club	Upper wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	536	East officers club	Upper wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	537	East officers club	Lower wall	1	Wood	Stained	Poor	-0.1		
7/27	538	East officers club	Lower wall	2	Wood	Stained	Poor	-0.1		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	539	East officers club	Lower wall	3	Wood	Stained	Poor	0.0		
7/27	540	East officers club	Lower wall	4	Wood	Stained	Poor	-0.0		
7/27	541	East officers club	Column	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	542	East officers club	Wall molding	1	Wood	Beige	Poor	9.3	Positive	
7/27	543	East officers club	Ceiling	5	Plaster	White	Poor	>9.9	Positive	
7/27	544	East officers club	Beam ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	545	2nd fl., office 2-2-6	Door	1	Wood	Stained	Poor	-0.1		
7/27	546	2nd fl., office 2-2-6	Door case	1	Wood	Stained	Poor	-0.0		
7/27	547	2nd fl., office 2-2-6	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	548	2nd fl., office 2-2-6	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	549	2nd fl., office 2-2-6	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	550	2nd fl., office 2-2-6	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	551	2nd fl., office 2-2-6	Baseboard	3	Wood	Beige	Poor	0.2		
7/27	552	2nd fl., office 2-2-6	Radiator cover	3	Metal	Beige	Poor	0.2		
7/27	553	2nd fl., office 2-2-6	Radiator	3	Metal	Beige	Poor	0.0		
7/27	554	2nd fl., office 2-2-6	Window sill	3	Wood	Beige	Poor	0.7		
7/27	555	2nd fl., office 2-2-6	Window case	3	Wood	Beige	Poor	0.6		
7/27	556	2nd fl., office 2-2-6	Window apron	3	Wood	Beige	Poor	-0.1		
7/27	557	2nd fl., office 2-2-6	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	558	2nd fl., office 2-2-6	Door	1	Plaster	Green	Poor	>9.9	Positive	
7/27	559	2nd fl., bath 2-2-6	Door case	1	Wood	Green	Poor	>9.9	Positive	
7/27	560	2nd fl., bath 2-2-6	Wall	1	Wood	Green	Poor	>9.9	Positive	
7/27	561	2nd fl., bath 2-2-6	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/27	562	2nd fl., bath 2-2-6	Wall	3	Plaster	Green	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	563	2nd fl., bath 2-2-6	Wall	4	Plaster	Green	Poor	>9.9	Positive	
7/27	564	2nd fl., bath 2-2-6	Window case	4	Wood	Green	Poor	>9.9	Positive	
7/27	565	2nd fl., bath 2-2-6	Window sash	4	Wood	Green	Poor	>9.9	Positive	
7/27	566	2nd fl., closet 2-2-6	Door	1	Wood	Grey	Poor	>9.9	Positive	
7/27	567	2nd fl., closet 2-2-6	Door case	1	Wood	Grey	Poor	>9.9	Positive	
7/27	568	2nd fl., closet 2-2-6	Wall	1	Plaster	Grey	Poor	>9.9	Positive	
7/27	569	2nd fl., closet 2-2-6	Wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/27	570	2nd fl., closet 2-2-6	Wall	3	Plaster	Grey	Poor	>9.9	Positive	
7/27	571	2nd fl., closet 2-2-6	Wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/27	572	2nd fl., closet 2-2-6	Pipe riser	3	Metal	Grey	Poor	>9.9	Positive	
7/27	573	2nd fl., closet 2-2-6	Shelf	3	Wood	Grey	Poor	>9.9	Positive	
7/27	574	2nd fl., closet 2-2-6	Shelf support	3	Wood	Grey	Poor	>9.9	Positive	
7/27	575	2-2-5	Door	1	Wood	Stained	Poor	-0.2		
7/27	576	2-2-5	Door case	1	Wood	Black	Poor	1.0	Positive	
7/27	577	2-2-5	Baseboard	3	Wood	Black	Poor	-0.1		
7/27	578	2-2-5	Radiator	3	Metal	Black	Poor	0.4		
7/27	579	2-2-5	Window sill	3	Wood	Black	Poor	0.3		
7/27	580	2-2-5	Window case	3	Wood	Black	Poor	0.1		
7/27	581	2-2-5	Window apron	3	Wood	Black	Poor	0.4		
7/27	582	2-2-5	Wall	4	Plaster	Beige	Poor	>9.9	Positive	
7/27	583	2-2-5	Pipe riser	3	Metal	Black	Poor	1.5	Positive	
7/27	584	2-2-5	Molding ceiling	5	Wood	Beige	Poor	0.1		
7/27	585	2-2-5	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	586	2nd fl., corridor	Floor	6	Concrete	Grey	Poor	1.5	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	587	West officers club	Door case	1	Wood	Black	Poor	0.1		
7/27	588	West officers club	Wall	1	Plaster	Green	Poor	>9.9	Positive	
7/27	589	West officers club	Wall	2	Plaster	Green	Poor	>9.9	Positive	
7/27	590	West officers club	Wall	3	Plaster	Green	Poor	>9.9	Positive	
7/27	591	West officers club	Wall	4	Plaster	Green	Poor	>9.9	Positive	
7/27	592	West officers club	Wall molding	1	Wood	White	Poor	>9.9	Positive	
7/27	593	West officers club	Fire place	2	Brick	Beige	Fair	-0.0		
7/27	594	West officers club	Ceiling	5	Plaster	White	Fair	>9.9	Positive	
7/27	595	West officers club	Door	1	Wood	White	Fair	>9.9	Positive	
7/27	596	East stairs to 3rd fl.	Hand rail	1	Metal	Green/black	Poor	>9.9	Positive	
7/27	597	East stairs to 3rd fl.	Newel post	1	Metal	Green/black	Poor	>9.9	Positive	
7/27	598	East stairs to 3rd fl.	Ballust	1	Metal	Green/black	Poor	>9.9	Positive	
7/27	599	East stairs to 3rd fl.	Wall	1	Plaster	Beige	Poor	>9.9	Positive	
7/27	600	East stairs to 3rd fl.	Wall	2	Plaster	Beige	Poor	>9.9	Positive	
7/27	601	East stairs to 3rd fl.	Wall	3	Plaster	Beige	Poor	>9.9	Positive	
7/27	602	East stairs to 3rd fl.	Wall	4	Plaster	Beige	Poor	5.9	Positive	
7/27	603	East stairs to 3rd fl.	Ceiling	5	Plaster	Grey	Poor	>9.9	Positive	
7/27	604	East stairs to 3rd fl.	Baseboard	2	Wood	Beige	Poor	>9.9	Positive	
7/27	605	East stairs to 3rd fl.	Door	4	Metal	Beige	Poor	>9.9	Positive	
7/27	606	East stairs to 3rd fl.	Door case	4	Metal	Beige	Poor	>9.9	Positive	
7/27	607	3rd fl., officers lounge	Door case	1	Wood	Blue	Poor	>9.9	Positive	
7/27	608	3rd fl., officers lounge	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/27	609	3rd fl., officers lounge	Wall	2	Plaster	Blue	Poor	>9.9	Positive	
7/27	610	3rd fl., officers lounge	Wall	3	Plaster	Blue	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	611	3rd fl., officers lounge	Wall	4	Plaster	Blue	Poor	>9.9	Positive	
7/27	612	3rd fl., officers lounge	Baseboard	2	Wood	Black	Poor	>9.9	Positive	
7/27	613	3rd fl., officers lounge	Radiator	4	Metal	Blue	Poor	1.9	Positive	
7/27	614	3rd fl., officers lounge	Window sill	4	Wood	Blue	Poor	>9.9	Positive	
7/27	615	3rd fl., officers lounge	Window apron	4	Wood	Blue	Poor	>9.9	Positive	
7/27	616	3rd fl., officers lounge	Ceiling	5	Plaster	Blue/white	Poor	>9.9	Positive	
7/27	617	3rd fl., officers lounge	Pipe riser	4	Metal	Blue/blue	Poor	>9.9	Positive	
7/27	618	3rd fl., officers lounge	Bar	4	Wood	Varnish	Poor	-0.1		
7/27	619	3rd fl., officers lounge	Wall	1	Plaster	Dark green	Poor	>9.9	Positive	
7/27	620	West stairs to 3rd fl.	Wall	2	Plaster	Dark green	Poor	>9.9	Positive	
7/27	621	West stairs to 3rd fl.	Wall	3	Plaster	Dark green	Poor	>9.9	Positive	
7/27	622	West stairs to 3rd fl.	Wall	4	Plaster	Dark green	Poor	>9.9	Positive	
7/27	623	West stairs to 3rd fl.	Electrical panel	1	Wood	Dark green	Poor	>9.9	Positive	
7/27	624	West stairs to 3rd fl.	Ceiling	5	Plaster	Dark green	Poor	8.3	Positive	
7/27	625	West stairs to 3rd fl.	Baseboard	3	Wood	Dark green	Poor	>9.9	Positive	
7/27	626	West stairs to 3rd fl.	Hand rail	1	Metal	Dark green	Poor	8.0	Positive	
7/27	627	West stairs to 3rd fl.	Newel post	1	Metal	Dark green	Poor	6.3	Positive	
7/27	628	West stairs to 3rd fl.	Baluster	1	Metal	Dark green	Poor	>9.9	Positive	
7/27	629	West Turret	Wall	1	Plaster	Brown	Poor	>9.9	Positive	
7/27	630	West Turret	Wall	2	Plaster	Brown	Poor	>9.9	Positive	
7/27	631	West Turret	Wall	3	Plaster	Brown	Poor	>9.9	Positive	
7/27	632	West Turret	Wall	4	Plaster	Brown	Poor	>9.9	Positive	
7/27	633	West Turret	Ceiling	5	Plaster	Brown	Poor	>9.9	Positive	
7/27	634	West Turret	Pipe riser	4	Metal	Brown	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	635	West Turret	Radiator	4	Metal	Silver	Poor	6.4	Positive	
7/27	636	West Turret	Hand rail	1	Metal	Grey	Poor	>9.9	Positive	
7/27	637	West Turret	Stair tread	1	Metal	Grey	Poor	>9.9	Positive	
7/27	638	West Turret	Stair riser	1	Metal	Grey	Poor	>9.9	Positive	
7/27	639	West Turret	Stringer	1	Metal	Grey	Poor	>9.9	Positive	
7/27	640	Calibrate						1.8		
7/27	641	Calibrate						1.7	Avg. 1.8	
7/27	642	Calibrate						1.8		
7/27	643	East 2, tower apt. living room	Door	1	Wood	Stained	Fair	-0.0		
7/27	644	East 2, tower apt. living room	Door case	1	Wood	Stained	Fair	0.1		
7/27	645	East 2, tower apt. living room	Wall	1	Plaster	Yellow	Poor	>9.9	Positive	
7/27	646	East 2, tower apt. living room	Wall	2	Plaster	Yellow	Poor	1.7	Positive	
7/27	647	East 2, tower apt. living room	Wall	3	Plaster	Yellow	Poor	3.9	Positive	
7/27	648	East 2, tower apt. living room	Wall	4	Plaster	Yellow	Poor	>9.9	Positive	
7/27	649	East 2, tower apt. living room	Baseboard	1	Wood	Grey	Poor	-0.0		
7/27	650	East 2, tower apt. living room	Radiator	3	Metal	Silver	Poor	1.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	651	East 2, tower apt. living room	Window sill	4	Wood	Black	Poor	0.2		
7/27	652	East 2, tower apt. living room	Wall molding	2	Wood	Yellow	Poor	>9.9	Positive	
7/27	653	East 2, tower apt. living room	Shelf	4	Wood	Blue	Poor	1.3	Positive	
7/27	654	East 2, tower apt. living room	Shelf support	4	Wood	Blue	Poor	0.4		
7/27	655	East 2, tower apt. living room	Pipe riser	3	Metal	Silver	Poor	2.5	Positive	
7/27	656	Office	Door	1	Wood	Grey	Poor	>9.9	Positive	
7/27	657	Office	Door case	1	Wood	Grey	Poor	>9.9	Positive	
7/27	658	Office	Wall	1	Plaster	Grey	Poor	>9.9	Positive	
7/27	659	Office	Wall	2	Plaster	Grey	Poor	>9.9	Positive	
7/27	660	Office	Wall	3	Plaster	Grey	Poor	>9.9	Positive	
7/27	661	Office	Wall	4	Plaster	Grey	Poor	>9.9	Positive	
7/27	662	Office	Baseboard	3	Wood	Grey	Poor	>9.9	Positive	
7/27	663	Office	Radiator	4	Metal	Silver	Poor	>9.9	Positive	
7/27	664	Office	Wall	4	Brick	Grey	Poor	-0.0		
7/27	665	Office	Ceiling	5	Plaster	Grey	Poor	>9.9	Positive	
7/27	666	East Turret	living room ceiling	5	Plaster	White	Poor	>9.9	Positive	
7/27	667	East Turret	Wall	1	Plaster	Blue	Poor	>9.9	Positive	
7/27	668	East Turret	Wall	3	Plaster	Blue	Poor	>9.9	Positive	
7/27	669	East Turret	Wall	3	Plaster	Grey	Poor	>9.9	Positive	

Tab. .
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	670	East Turret	Pipe riser	3	Metal	Grey	Poor	2.0	Positive	
7/27	671	East Turret	Window sill	3	Wood	Black	Poor	0.1		
7/27	672	East Turret	Window case	3	Wood	Black	Poor	0.2		
7/27	673	East Turret	Ceiling	5	Plaster	Beige	Poor	>9.9	Positive	
7/27	674	Staircase	Hand rail	3	Metal	Yellow	Poor	>9.9	Positive	
7/27	675	Drill floor	Upper wall	1	Plaster	Beige	Poor	0.1		
7/27	676	Southwest corner	Lower wall	1	Plaster	Green	Poor	1.0	Positive	
7/27	677	Southwest corner	Lower wall	1	Plaster	Brown	Poor	1.5	Positive	
7/27	678	Southwest corner	Window frame	1	Wood	Beige	Poor	3.2	Positive	
7/27	679	Southwest corner	Door	1	Wood	Green	Poor	>9.9	Positive	
7/27	680	Southwest corner	Door case	1	Wood	Green	Poor	>9.9	Positive	
7/27	681	Southwest corner	Window apron	1	Concrete	Green	Poor	1.8	Positive	
7/27	682	Southwest corner	Steel structure upper	1	Metal	Beige	Poor	>9.9	Positive	
7/27	683	Southwest corner	Steel structure lower	1	Metal	Green	Poor	>9.9	Positive	
7/27	684	Southwest corner	Radiator cover	1	Metal	Green	Poor	5.2	Positive	
7/27	685	Southwest corner	Radiator	1	Metal	Silver	Poor	2.8	Positive	
7/27	686	Southwest corner	Upper wall	1	Brick	Beige	Poor	0.2		
7/27	687	Southwest corner	Lower wall	1	Brick	Green	Poor	5.2	Positive	
7/27	688	Southwest corner	Door case	1	Wood	Green	Poor	-0.0		
7/27	689	Southwest corner	Door case	1	Metal	Dark green	Poor	-0.1		
7/27	690	Southwest corner	Pipe riser	1	Metal	White	Poor	5.4	Positive	
7/27	691	Southwest corner	Pipe riser	1	Metal	Green	Poor	>9.9	Positive	
7/27	692	Southwest corner	Upper wall	1	Brick	Red	Poor	-0.0		
7/27	693	Southwest corner	Steel structure	1	Metal	White	Poor	7.0	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	694	Southwest corner	Steel structure	1	Metal	Green	Poor	>9.9	Positive	
7/27	695	Southwest corner	Lower wall	1	Brick	Brown	Poor	5.7	Positive	
7/27	696	Southwest corner	Pipe riser	1	Metal	Brown	Poor	7.9	Positive	
7/27	697	Southwest corner	Radiator cover	1	Metal	Brown	Poor	4.2	Positive	
7/27	698	Southwest corner	Steel structure	1	Metal	Yellow	Poor	>9.9	Positive	
7/27	699	Southwest corner	Steel structure	1	Metal	Brown	Poor	>9.9	Positive	
7/27	700	Southwest corner	Lower wall	1	Brick	Grey	Poor	>9.9	Positive	
7/27	701	Southwest corner	Pipe riser	1	Metal	Grey	Poor	>9.9	Positive	
7/27	702	Southwest corner	Steel structure	1	Metal	Grey	Poor	>9.9	Positive	
7/27	703	Drill floor	Radaitor	1	Metal	Grey	Poor	1.9	Positive	
7/27	704	Drill floor	Steel structure	1	Metal	White	Poor	5.8	Positive	
7/27	705	Drill floor	Upper wall	1	Concrete	White	Poor	-0.0		
7/27	706	Drill floor	Lower wall	1	Concrete	Brown	Poor	0.2		
7/27	707	Garage	Door case	2	Metal	Yellow	Fair	0.7		
7/27	708	Drill floor	Safety post	2	Metal	Yellow	Fair	5.3		
7/27	709	Drill floor	Door	3	Wood	Brown	Poor	3.5	Positive	
7/27	710	Drill floor	Door case	3	Wood	Brown	Poor	3.1	Positive	
7/27	711	Drill floor	Upper wall	3	Brick	Grey	Poor	5.7	Positive	
7/27	712	Drill floor	Lower wall	3	Brick	Brown	Poor	4.0	Positive	
7/27	713	Drill floor	Radiator cover	3	Metal	Brown	Poor	3.4	Positive	
7/27	714	Drill floor	Radiator	3	Metal	Brown	Poor	4.3	Positive	
7/27	715	Drill floor	Steel structure	3	Metal	Grey	Poor	>9.9	Positive	
7/27	716	Drill floor	Steel structure	3	Metal	Brown	Poor	>9.9	Positive	
7/27	717	Drill floor	Steel structure	3	Metal	Green	Poor	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/27	718	Drill floor	Upper wall	3	Concrete	White	Poor	0.4		
7/27	719	Drill floor	Lower wall	3	Concrete	Brown	Poor	-0.0		
7/27	720	Drill floor	Door	3	Metal	Brown	Poor	0.2		
7/27	721	Drill floor	Door case	3	Metal	Brown	Poor	0.4		
7/27	722	Drill floor	Wall	3	Wood	Blue	Poor	3.6	Positive	
7/27	723	Drill floor	Wall	3	Wood	Red	Poor	0.1		
7/27	724	Drill floor	Upper wall	3	Wood	White	Poor	-0.1		
7/27	725	Drill floor	Lower wall	3	Wood	Brown	Poor	0.0		
7/27	726	Drill floor	Upper wall	3	Brick	Lt. Grey	Poor	3.6	Positive	
7/27	727	Drill floor	Lower wall	3	Brick	Grey	Poor	>9.9	Positive	
7/27	728	Drill floor	Floor	6	Concrete	Grey	Poor	1.0	Positive	
7/28	729	Calibrate						1.7		
7/28	730	Calibrate						1.9	Avg. 1.7	
7/28	731	Calibrate						1.8		
7/28	732	Calibrate						1.8		
7/28	733	Calibrate						1.9	Avg. 1.8	
7/28	734	Calibrate						1.8		
7/28	735	Drill floor	Gate	4	Metal	Green	Poor	0.0		
7/28	736	Drill floor	Gate case	4	Metal	Green	Poor	2.1	Positive	
7/28	737	Drill floor	Upper wall	4	Brick	White	Poor	0.0		
7/28	738	Drill floor	Lower	1	Brick	Brown	Poor	>9.9	Positive	
7/28	739	By office 1-W2	Hand rail	1	Metal	Grey	Poor	0.3		
7/28	740	By office 1-W2	Newel post	1	Metal	Grey	Poor	0.3		
7/28	741	Drill floor	Stringer	1	Metal	Grey	Poor	9.3	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	742	Drill floor	Side of mezz. deck	1	Metal	Green	Poor	8.4	Positive	
7/28	743	Drill floor	Side of mezz. deck	1	Metal	White	Poor	5.7	Positive	
7/28	744	Drill floor	Hand rail	1	Metal	Grey	Poor	3.0	Positive	
7/28	745	Drill floor	Newel post	1	Metal	Grey	Poor	>9.9	Positive	
7/28	746	Drill floor	Stringer	1	Metal	Grey	Poor	9.6	Positive	
7/28	747	Drill floor	Hand rail	3	Metal	Grey	Poor	2.1	Positive	
7/28	748	Drill floor	Newel post	3	Metal	Grey	Poor	>9.9	Positive	
7/28	749	Drill floor	Stringer	3	Metal	Grey	Poor	9.0	Positive	
7/28	750	Drill floor balcony	Window sill	3	Wood	White	Poor	2.7	Positive	
7/28	751	Drill floor balcony	Window apron	3	Wood	Grate	Poor	0.7		
7/28	752	Drill floor balcony	Metal structure	3	Metal	Green	Poor	>9.9	Positive	
7/28	753	Drill floor balcony	Radiator	3	Metal	Green	Poor	>9.9	Positive	
7/28	754	Drill floor balcony	Metal structure	3	Metal	Green	Poor	9.7	Positive	
7/28	755	Drill floor balcony	Fence	3	Metal	Green	Poor	1.7	Positive	
7/28	756	Drill floor balcony	Chair	3	Metal	Black	Poor	-0.1		
7/28	757	Drill floor balcony	Chair	1	Metal	Black	Poor	5.0	Positive	
7/28	758	Drill floor balcony	Metal structure	3	Metal	Green	Poor	5.4	Positive	
7/28	759	Drill floor balcony	Chair	1	Metal	Black	Poor	0.1		
7/28	760	Drill floor balcony	Fence	3	Metal	Green	Poor	3.8	Positive	
7/28	761	Drill floor balcony	Metal structure	1	Metal	Green	Poor	7.6	Positive	
7/28	762	Drill floor balcony	Fence	1	Metal	Green	Poor	2.0	Positive	
7/28	763	Drill floor balcony	Chair	1	Wood	Black	Poor	-0.0		
7/28	764	Drill floor balcony	Chair	1	Metal	Black	Poor	0.5		
7/28	765	Drill floor balcony	Wall	1	Brick	White	Poor	2.7	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	766	Drill floor balcony	Steel structure	1	Metal	Green	Poor	>9.9	Positive	
7/28	767	Drill floor balcony	Chair	1	Wood	Black	Poor	0.1		
7/28	768	Drill floor balcony	Chair	1	Metal	Black	Poor	0.5		
7/28	769	Drill floor balcony	Wall	1	Brick	White	Poor	0.0		
7/28	770	Drill floor balcony	Steel structure	1	Metal	Green	Poor	>9.9	Positive	
7/28	771	Drill floor balcony	Fence	1	Metal	Green	Poor	2.5	Positive	
7/28	772	Drill floor balcony	Wall	1	Brick	White	Poor	-0.1		
7/28	773	Homeless shelter corridor	Door	1	Metal	Purple	Fair	-0.0		
7/28	774	Homeless shelter corridor	Door case	1	Metal	Purple	Fair	0.1		
7/28	775	Homeless shelter corridor	Upper wall	1	Sheetrock	Pink	Fair	0.2		
7/28	776	Homeless shelter corridor	Upper wall	6	Sheetrock	Pink	Fair	0.1		
7/28	777	Homeless shelter corridor	Upper wall	3	Sheetrock	Pink	Fair	0.1		
7/28	778	Homeless shelter corridor	Upper wall	4	Sheetrock	Pink	Fair	-0.1		
7/28	779	Homeless shelter corridor	Lower wall	1	Sheetrock	Purple	Fair	-0.0		
7/28	780	Homeless shelter corridor	Lower wall	2	Sheetrock	Purple	Fair	-0.1		

Tab 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	781	Homeless shelter corridor	Lower wall	3	Sheetrock	Purple	Fair	-0.2		
7/28	782	Homeless shelter corridor	Lower wall	4	Sheetrock	Purple	Fair	-0.1		
7/28	783	Homeless shelter corridor	Door	4	Metal	Red	Fair	-0.1		
7/28	784	Homeless shelter corridor	Door case	4	Metal	Red	Fair	-0.0		
7/28	785	E dorm	Door	1	Metal	Blue	Fair	-0.0		
7/28	786	E dorm	Door case	1	Metal	Blue	Fair	-0.0		
7/28	787	E dorm	Upper wall	1	Sheetrock	Lt. Blue	Fair	-0.0		
7/28	788	E dorm	Upper wall	2	Sheetrock	Lt. Blue	Fair	-0.2		
7/28	788	E dorm	Upper wall	3	Plaster	Lt. Blue	Fair	-0.1		
7/28	789	E dorm	Upper wall	4	Plaster	Lt. Blue	Fair	>9.9	Positive	
7/28	790	E dorm	Lower wall	1	Sheetrock	Dark blue	Fair	-0.2		
7/28	791	E dorm	Lower wall	2	Sheetrock	Dark blue	Fair	-0.1		
7/28	792	E dorm	Lower wall	3	Plaster	Dark blue	Fair	>9.9	Positive	
7/28	793	E dorm	Lower wall	4	Plaster	Dark blue	Fair	>9.9	Positive	
7/28	794	E dorm	Window sill	3	Wood	Blue	Fair	>9.9	Positive	
7/28	795	E dorm	Window case	3	Wood	Blue	Fair	>9.9	Positive	
7/28	796	E dorm	Window sash	3	Wood	Blue	Fair	>9.9	Positive	
7/28	797	E dorm	Window apron	3	Wood	Blue	Fair	-0.1		
7/28	798	E dorm	Radiator	3	Metal	Blue	Fair	0.5		
7/28	799	E dorm	Hand rail	4	Metal	Black	Fair	0.5		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	800	E dorm	Stair tread	4	Concrete	Brown	Fair	0.0		
7/28	801	E dorm	Stair riser	4	Concrete	Brown	Fair	0.1		
7/28	802	E dorm	Pipe riser	3	Metal	Blue	Fair	>9.9	Positive	
7/28	803	E dorm	Partition	6	Wood	Blue	Fair	-0.0		
7/28	804	E dorm	Ceiling	5	Concrete	White	Fair	>9.9	Positive	
7/28	805	E dorm	Dujct	5	Metal	Beige	Fair	0.7		
7/28	806	D dorm	Door	1	Metal	Pink	Fair	-0.1		
7/28	807	D dorm	Door case	1	Metal	Pink	Fair	-0.0		
7/28	808	D dorm	Upper wall	1	Sheetrock	Beige	Fair	-0.1		
7/28	809	D dorm	Upper wall	2	Sheetrock	Beige	Fair	-0.1		
7/28	810	D dorm	Upper wall	3	Sheetrock	Beige	Fair	-0.3		
7/28	811	D dorm	Upper wall	4	Sheetrock	Beige	Fair	-0.0		
7/28	812	D dorm	Lower wall	1	Sheetrock	Pink	Fair	-0.1		
7/28	813	D dorm	Lower wall	2	Sheetrock	Pink	Fair	-0.1		
7/28	814	D dorm	Lower wall	3	Sheetrock	Pink	Fair	-0.0		
7/28	815	D dorm	Lower wall	4	Sheetrock	Pink	Fair	-0.1		
7/28	816	D dorm	Window sill	3	Wood	Pink	Fair	>9.9	Positive	
7/28	817	D dorm	Window case	3	Wood	Pink	Fair	>9.9	Positive	
7/28	818	D dorm	Window sash	3	Wood	Pink	Fair	>9.9	Positive	
7/28	819	D dorm	Window apron	3	Wood	Pink	Fair	-0.1		
7/28	820	D dorm	Radiator	3	Metal	Pink	Poor	3.2	Positive	
7/28	821	D dorm	Partition	3	Wood	Pink	Poor	-0.1		
7/28	822	D dorm	Duct	5	Metal	Beige	Fair	0.5		
7/28	823	D dorm	Ceiling	5	Concrete	Beige	Fair	>9.9	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	824	B dorm	Door	1	Metal	Brown	Fair	-0.2		
7/28	825	B dorm	Door case	1	Metal	Purple	Fair	-0.1		
7/28	826	B dorm	Upper wall	1	Sheetrock	Beige	Fair	-0.2		
7/28	827	B dorm	Upper wall	2	Sheetrock	Beige	Fair	-0.1		
7/28	828	B dorm	Upper wall	3	Plaster	Beige	Fair	>9.9	Positive	
7/28	829	B dorm	Upper wall	4	Sheetrock	Beige	Fair	-0.2		
7/28	830	B dorm	Lower wall	1	Sheetrock	Yellow	Fair	0.0		
7/28	831	B dorm	Lower wall	2	Sheetrock	Yellow	Fair	-0.0		
7/28	832	B dorm	Lower wall	3	Plaster	Yellow	Fair	>9.9	Positive	
7/28	833	B dorm	Lower wall	4	Sheetrock	Yellow	Fair	-0.1		
7/28	834	B dorm	Window sill	3	Wood	Yellow	Fair	-0.1		
7/28	835	B dorm	Window case	3	Wood	Yellow	Fair	8.9	Positive	
7/28	836	B dorm	Window sash	3	Wood	Yellow	Fair	6.3	Positive	
7/28	837	B dorm	Window apron	3	Wood	Yellow	Fair	0.2		
7/28	838	B dorm	Radiator	3	Metal	Yellow	Fair	0.2		
7/28	839	B dorm	Duct	5	Metal	Beige	Fair	0.7		
7/28	840	B dorm	Ceiling	5	Concrete	Beige	Fair	9.7	Positive	
7/28	841	A dorm	Door	1	Metal	Peach	Fair	-0.1		
7/28	842	A dorm	Door case	1	Metal	Peach	Fair	-0.1		
7/28	843	A dorm	Upper wall	1	Sheetrock	Pink	Fair	-0.0		
7/28	844	A dorm	Upper wall	2	Plaster	Pink	Fair	>9.9	Positive	
7/28	845	A dorm	Upper wall	3	Plaster	Pink	Fair	>9.9	Positive	
7/28	846	A dorm	Upper wall	4	Sheetrock	Pink	Fair	0.0		
7/28	847	A dorm	Lower wall	1	Sheetrock	Peach	Fair	-0.3		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	848	A dorm	Lower wall	2	Plaster	Peach	Fair	0.0		
7/28	849	A dorm	Lower wall	3	Plaster	Peach	Fair	>9.9	Positive	
7/28	850	A dorm	Lower wall	4	Sheetrock	Peach	Fair	-0.0		
7/28	851	A dorm	Window sill	3	Wood	Peach	Fair	>9.9	Positive	
7/28	852	A dorm	Window case	3	Wood	Peach	Fair	>9.9	Positive	
7/28	853	A dorm	Window sash	3	Wood	Peach	Fair	5.9	Positive	
7/28	854	A dorm	Window apron	3	Wood	Peach	Fair	0.0		
7/28	855	A dorm	Radiator	3	Metal	Peach	Fair	-0.0		
7/28	856	A dorm	Pipe riser	3	Metal	Peach	Fair	0.4		
7/28	857	A dorm	Duct	3	Metal	Pink	Fair	>9.9	Positive	
7/28	858	A dorm	Ceiling	5	Concrete	Beige	Fair	>9.9	Positive	
7/28	859	A dorm	Duct	5	Metal	Beige	Fair	0.7		
7/28	860	A dorm	Partition	6	Wood	Pink	Fair	0.1		
7/28	861	Foyer, exit B	Door	1	Metal	Red	Fair	0.4		
7/28	862	Foyer, exit B	Door case	1	Metal	Red	Fair	1.6	Positive	
7/28	863	Foyer, exit B	Wall	1	Plaster	White	Fair	-0.1		
7/28	864	Foyer, exit B	Wall	2	Sheetrock	White	Fair	-0.1		
7/28	865	Foyer, exit B	Wall	3	Plaster	White	Fair	>9.9	Positive	
7/28	866	Foyer, exit B	Wall	4	Plaster	White	Fair	>9.9	Positive	
7/28	867	Foyer, exit B	Ceiling	5	Concrete	White	Fair	>9.9	Positive	
7/28	868	Foyer, exit B	Floor	6	Concrete	Grey	Poor	0.1		
7/28	869	Foyer, exit B	Hand rail	4	Metal	Black	Poor	0.4		
7/28	870	Foyer, exit B	Stair tread	4	Concrete	Black	Poor	0.4		
7/28	871	Foyer, exit B	Stair riser	4	Concrete	Black	Poor	0.4		

Table
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	872	Foyer, exit B	Stringer	4	Concrete	Black	Fair	1.0	Positive	
7/28	873	National Guard area, entry foyer	Door	1	Metal	Grey	Fair	6.2	Positive	
7/28	874	National Guard area, entry foyer	Door case	1	Metal	Grey	Fair	5.2	Positive	
7/28	875	National Guard area, entry foyer	Door screen	1	Metal	Black	Fair	0.6		
7/28	876	National Guard area, entry foyer	Window case	4	Metal	Beige	Fair	2.7	Positive	
7/28	877	National Guard area, entry foyer	Window sash	4	Metal	Beige	Fair	3.7	Positive	
7/28	878	1st floor, corridor	Door case	1	Metal	Grey	Fair	0.1		
7/28	879	1st floor, corridor	Upper wall	1	Concrete	Ivory	Fair	1.3	Positive	
7/28	880	1st floor, corridor	Upper wall	2	Concrete	Ivory	Fair	1.0	Positive	
7/28	881	1st floor, corridor	Upper wall	3	Concrete	Ivory	Fair	1.3	Positive	
7/28	882	1st floor, corridor	Upper wall	4	Concrete	Ivory	Fair	-0.1		
7/28	883	1st floor, corridor	Lower wall	1	Concrete	Grey	Fair	0.4		
7/28	884	1st floor, corridor	Lower wall	2	Concrete	Grey	Fair	1.0	Positive	
7/28	885	1st floor, corridor	Lower wall	3	Concrete	Grey	Fair	1.4	Positive	
7/28	886	1st floor, corridor	Lower wall	4	Concrete	Grey	Fair	1.0	Positive	
7/28	887	1st floor, corridor	Radiator	3	Metal	Grey	Fair	0.6		
7/28	888	1st floor, corridor	Window sill	1	Concrete	Ivory	Fair	1.0	Positive	
7/28	889	1st floor, corridor	Window case	1	Metal	Black	Fair	1.6	Positive	
7/28	890	1st floor, corridor	Window sash	1	Metal	Black	Fair	2.5	Positive	

Table
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	891	1st floor, corridor	Ceiling	5	Sheetrock	Ivory	Fair	-0.0		
7/28	892	1st floor, corridor	Floor	6	Concrete	Grey	Fair	-0.2		
7/28	893	1st floor, corridor	Door	2	Metal	Red	Fair	-0.1		
7/28	894	1st floor, corridor	Door case	2	Metal	Red	Fair	-0.0		
7/28	895	2nd floor, corridor	Door	2	Wood	Stained	Fair	0.7		
7/28	896	2nd floor, corridor	Door case	2	Metal	Grey	Fair	1.4	Positive	
7/28	897	Office 2-14	Door	1	Wood	Grey	Fair	-0.3		
7/28	898	Office 2-14	Door case	1	Metal	Grey	Fair	1.6	Positive	
7/28	899	Office 2-14	Wall	1	Concrete	Ivory	Fair	1.4	Positive	
7/28	900	Office 2-14	Wall	2	Concrete	Ivory	Fair	1.7	Positive	
7/28	901	Office 2-14	Wall	3	Concrete	Ivory	Fair	1.3	Positive	
7/28	902	Office 2-14	Window sill	3	Concrete	Black	Fair	1.9	Positive	
7/28	903	Office 2-14	Window case	3	Metal	Black	Fair	4.0	Positive	
7/28	904	Office 2-14	Window sash	3	Metal	Black	Fair	2.8	Positive	
7/28	905	Office 2-14	Radiator	3	Metal	Black	Fair	0.6		
7/28	906	Office 24, staircase	Door	1	Metal	Brown	Fair	1.7	Positive	
7/28	907	Office 24, staircase	Upper wall	1	Concrete	Ivory	Fair	0.3		
7/28	908	Office 24, staircase	Upper wall	2	Concrete	Ivory	Fair	2.1	Positive	
7/28	909	Office 24, staircase	Upper wall	3	Concrete	Ivory	Fair	0.3		
7/28	910	Office 24, staircase	Upper wall	4	Concrete	Ivory	Fair	0.5		
7/28	911	Office 24, staircase	Lower wall	1	Metal	Grey	Fair	0.5		
7/28	912	Office 24, staircase	Lower wall	2	Metal	Grey	Fair	0.5		
7/28	913	Office 24, staircase	Lower wall	3	Metal	Grey	Fair	0.5		
7/28	914	Office 24, staircase	Lower wall	4	Metal	Grey	Fair	0.5		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	915	Office 24, staircase	Window case	3	Metal	Ivory	Fair	1.6	Positive	
7/28	916	Office 24, staircase	Window sash	3	Metal	Ivory	Fair	2.6	Positive	
7/28	917	Office 24, staircase	Hand rail	3	Metal	Black	Fair	5.2	Positive	
7/28	918	Office 24, staircase	Newel post	3	Metal	Black	Fair	1.9	Positive	
7/28	919	Office 24, staircase	Stair tread	3	Concrete	Grey	Fair	-0.1		
7/28	920	Office 24, staircase	Stair riser	3	Metal	Black	Fair	1.6	Positive	
7/28	921	Office 24, staircase	Stringer	3	Metal	Black	Fair	4.8	Positive	
7/28	922	Basement	Wall	1	Concrete	Blue	Fair	-0.1		
7/28	923	Basement	Wall	2	Concrete	Blue	Fair	-0.1		
7/28	924	Basement	Wall	3	Concrete	Blue	Fair	-0.1		
7/28	925	Basement	Wall	4	Concrete	Blue	Fair	-0.2		
7/28	926	Basement	Ceiling	5	Concrete	Blue	Fair	-0.0		
7/28	927	Basement	Door case	1	Metal	Red	Fair	0.3		
7/28	928	Basement	Duct	5	Metal	Blue	Fair	0.3		
7/28	929	Basement	Pipe riser	4	Metal	Blue	Fair	0.4		
7/28	930	Office 1-1	Door	1	Wood	Grey	Fair	-0.0		
7/28	931	Office 1-1	Door case	1	Metal	Grey	Fair	0.2		
7/28	932	Office 1-1	Wall	1	Concrete	Ivory	Fair	0.2		
7/28	933	Office 1-1	Wall	2	Concrete	Ivory	Fair	0.2		
7/28	934	Office 1-1	Wall	3	Concrete	Ivory	Fair	0.4		
7/28	935	Office 1-1	Wall	4	Concrete	Ivory	Fair	0.0		
7/28	936	Office 1-1	Baseboard	4	Concrete	Grey	Fair	0.4		
7/28	937	Office 1-1	Pipe riser	2	Metal	Ivory	Fair	0.5		
7/28	938	Office 1-1	Window case	2	Metal	Blue	Fair	3.3	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	939	Office 1-1	Window sash	2	Metal	Blue	Fair	4.6	Positive	
7/28	940	Office 1-1	Ceiling	5	Sheetrock	White	Fair	0.0		
7/28	941	Office 1-1	Floor	6	Concrete	Grey	Fair	0.3		
7/28	942	National Guard garage	Door	1	Metal	Grey	Fair	1.8	Positive	
7/28	943	National Guard garage	Door case	1	Metal	Grey	Fair	0.2		
7/28	944	National Guard garage	Upper wall	2	Concrete	Lt. grey	Fair	0.1		
7/28	945	National Guard garage	Lower wall	2	Concrete	Dark grey	Fair	0.2		
7/28	946	National Guard garage	Upper wall	3	Concrete	Lt. grey	Fair	2.0	Positive	
7/28	947	National Guard garage	Lower wall	3	Concrete	Dark grey	Fair	2.0	Positive	
7/28	948	National Guard garage	Upper wall	4	Concrete	Lt. grey	Fair	-0.1		
7/28	949	National Guard garage	Lower wall	4	Concrete	Dark grey	Fair	0.0		
7/28	950	National Guard garage	Partition wall	4	Wood	Pink	Fair	-0.1		
7/28	951	National Guard garage	Upper wall	1	Concrete	Lt. grey	Fair	0.1		
7/28	952	National Guard garage	Lower wall	1	Concrete	Dark grey	Fair	0.1		
7/28	953	National Guard garage	Lower wall	1	Concrete	Red	Fair	-0.1		
7/28	954	National Guard garage	Window case	2	Metal	Grey	Poor	1.9	Positive	
7/28	955	National Guard garage	Floor	6	Concrete	Grey	Fair	-0.2		
7/28	956	National Guard garage	Ceiling	5	Concrete	Grey	Fair	-0.1		
7/28	957	National Guard garage	Beam	5	Metal	Grey	Fair	3.5	Positive	
7/28	958	National Guard garage	Floor	6	Concrete	Yellow	Fair	>9.9	Positive	
7/28	959	National Guard garage	Safety cover	2	Metal	Green	Fair	3.5	Positive	
7/28	960	National Guard garage	Control panel	4	Metal	Blue	Fair	0.0		
7/28	961	Calibrate						1.7		
7/28	962	Calibrate						1.9	Avg. 1.8	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	963	Calibrate						1.8		
7/28	964	Basement, auditorium	Door	1	Wood	Green	Poor	0.4		
7/28	965	Basement, auditorium	Door case	1	Wood	Green	Poor	0.5		
7/28	966	Basement, auditorium	Upper wall	1	Plaster	Grey	Poor	-0.1		
7/28	967	Basement, auditorium	Upper wall	2	Plaster	Grey	Poor	-0.0		
7/28	968	Basement, auditorium	Upper wall	4	Plaster	Grey	Poor	-0.1		
7/28	969	Basement, auditorium	Lower wall	1	Plaster	Beige	Poor	-0.0		
7/28	970	Basement, auditorium	Lower wall	2	Plaster	Beige	Poor	0.2		
7/28	971	Basement, auditorium	Lower wall	4	Plaster	Beige	Poor	-0.1		
7/28	972	Basement, auditorium	Baseboard	1	Concrete	Grey	Poor	0.5		
7/28	973	Basement, auditorium	Column upper	6	Concrete	Grey	Poor	0.1		
7/28	974	Basement, auditorium	Column lower	6	Concrete	Beige	Poor	-0.0		
7/28	975	Basement, auditorium	Floor	6	Concrete	Grey	Poor	0.3		
7/28	976	Basement, auditorium	Ceiling	5	Concrete	Grey	Poor	-0.0		
7/28	977	Basement, auditorium	Stringer	1	Metal	Beige	Poor	>9.9	Positive	
7/28	978	Bsmnt, corridor stairs	Hand rail	6	Metal	Grey	Poor	7.9	Positive	
7/28	979	Bsmnt, corridor stairs	Newel post	6	Metal	Grey	Poor	4.9	Positive	
7/28	980	Bsmnt, corridor stairs	Stringer	6	Metal	Grey	Poor	>9.9	Positive	
7/28	981	Bsmnt, corridor stairs	Hand rail	6	Metal	Grey	Poor	5.8	Positive	
7/28	982	Bsmnt, corridor stairs	Newel post	6	Concrete	Grey	Poor	6.4	Positive	
7/28	983	Bsmnt, corridor stairs	Stringer	6	Concrete	Grey	Poor	4.5	Positive	
7/28	984	Bsmnt, corridor stairs	Ceiling	5	Concrete	White	Poor	0.3		
7/28	985	Lock RC3	Ceiling	5	Concrete	White	Poor	7.2	Positive	
7/28	986	Lock RC17	Ceiling	5	Concrete	White	Poor	0.0		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	987	Gym	Ceiling	5	Concrete	Grey	Poor	-0.1		
7/28	988	Boiler R	Ceiling	5	Concrete	Grey	Poor	7.3	Positive	
7/28	989	Boiler R#1	Ceiling	5	Concrete	Grey	Poor	>9.9	Positive	
7/28	990	Boiler R#2	Ceiling	1	Concrete	Grey	Poor	0.3		
7/28	991	B40	Door case	1	Metal	Blue	Poor	1.7	Positive	
7/28	992	B40	Wall	1	Plaster	Yellow	Poor	-0.1		
7/28	993	B40	Wall	2	Plaster	Yellow	Poor	>9.9	Positive	
7/28	994	B40	Wall	3	Plaster	Yellow	Poor	>9.9	Positive	
7/28	995	B40	Wall	4	Plaster	Yellow	Poor	>9.9	Positive	
7/28	996	B40	Radiator	1	Metal	Silver	Poor	0.3		
7/28	997	B40	Window sill	3	Wood	Blue	Poor	0.2		
7/28	998	B40	Window case	3	Wood	Blue	Poor	0.3		
7/28	999	B40	Window sash	3	Wood	Blue	Poor	0.2		
7/28	1	B40	Window apron	3	Wood	Blue	Poor	0.2		
7/28	2	B40	Ceiling	5	Concrete	White	Poor	>9.9	Positive	
7/28	3	B40	Pipe riser	3	Metal	Blue	Poor	1.5	Positive	
7/28	4	B48	Door	1	Metal	Grey	Poor	4.5	Positive	
7/28	5	B48	Door case	1	Metal	Grey	Poor	7.8	Positive	
7/28	6	B48	Wall	1	Concrete	Yellow	Poor	-0.1		
7/28	7	B48	Wall	2	Concrete	Yellow	Poor	0.1		
7/28	8	B48	Wall	3	Brick	Yellow	Poor	0.1		
7/28	9	B48	Wall	4	Concrete	Green	Poor	0.0		
7/28	10	B48	Ceiling	5	Concrete	Green	Poor	0.0		
7/28	11	B48	Shelf	4	Wood	Grey	Poor	0.6		

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	12	B48	Shelf support	4	Wood	Grey	Poor	0.7		
7/28	13	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Hand rail	1	Metal	Grey	Poor	>9.9	Positive	
7/28	14	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Newel post	1	Metal	Grey	Poor	7.0	Positive	
7/28	15	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Stringer	1	Metal	Grey	Poor	8.8	Positive	
7/28	16	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Flag pole	1	Metal	Ivory	Poor	1.7	Positive	
7/28	17	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Flag pole base	1	Metal	Ivory	Poor	0.4		
7/28	18	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Artelery deco.	1	Metal	Ivory	Poor	1.5	Positive	
7/28	19	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Hand rail	1	Metal	Black	Poor	4.2	Positive	

Tab
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	20	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Door	1	Metal	Black	Poor	1.6	Positive	
7/28	21	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Guard railing	1	Metal	Black	Poor	1.5	Positive	
7/28	22	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Fence	1	Metal	Black	Poor	2.8	Positive	
7/28	23	Bsmnt, near RB3 stairs outside ext. of Kingsbridge Ave.	Gate	1	Metal	Black	Poor	0.2		
7/28	24	Ext. Jerome Avenue.	Door	4	Metal	Black	Poor	-0.0		
7/28	25	Ext. Jerome Avenue.	Door case	4	Metal	Black	Poor	1.5	Positive	
7/28	26	Ext. Jerome Avenue.	Door guard	4	Metal	Black	Poor	0.2		
7/28	27	Ext. Jerome Avenue.	Window apron	4	Concrete	Black	Poor	0.1		
7/28	28	Ext. Jerome Avenue.	Vent	4	Metal	Black	Poor	5.7	Positive	
7/28	29	Ext. Jerome Avenue.	Window guard	4	Metal	Black	Poor	1.4	Positive	
7/28	30	National Guard office building	Wall	1	Brick	Green	Poor	-0.0		
7/28	30	National Guard office building	Gate	1	Metal	Black	Poor	4.1	Positive	
7/28	31	National Guard office building	Fence	1	Metal	Black	Poor	5.4	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	32	National Guard office building	Hand rail	1	Metal	Grey	Poor	2.7	Positive	
7/28	33	National Guard office building	Door	1	Metal	Grey	Poor	5.4	Positive	
7/28	34	National Guard office building	Door case	1	Metal	Grey	Poor	3.9	Positive	
7/28	35	Exit	Gas guage	4	Metal	Yellow	Fair	1.8	Positive	
7/28	36	Exit	Gas guage	4	Metal	Grey	Fair	0.5		
7/28	37	Exit	Door	4	Metal	Grey	Fair	1.9	Positive	
7/28	38	Exit	Door case	4	Metal	Grey	Fair	5.3	Positive	
7/28	39	Exit	Hand rail	4	Metal	Grey	Fair	0.7		
7/28	40	Garage exit	Door case	1	Metal	Green	Fair	4.1	Positive	
7/28	41	Garage exit	Gate	1	Metal	Green	Fair	0.3		
7/28	42	Garage exit	Fence	1	Metal	Blak	Fair	3.1	Positive	
7/28	43	Garage exit	Door	2	Metal	Green	Fair	0.1		
7/28	44	Garage exit	Door case	2	Metal	Green	Fair	1.4	Positive	
7/28	45	Garage exit	Pipe riser	2	Metal	Green	Fair	1.7	Positive	
7/28	46	Garage exit	Window gate	1	Metal	Green	Fair	3.1	Positive	
7/28	47	Garage exit	Smoke stack door	2	Metal	Green	Fair	-0.0		
7/28	48	Garage exit	Storage cont. wall	1	Metal	Green	Fair	-0.0		
7/28	49	Garage exit	Storage cont. wall	2	Metal	Green	Fair	0.4		
7/28	50	Garage exit	Storage cont. wall	4	Metal	Green	Fair	0.4		
7/28	51	Garage exit	Fence	4	Metal	Black	Fair	>9.9	Positive	
7/28	52	Garage exit	Door	4	Metal	Green	Fair	3.5	Positive	

Table 1
Kingsbridge Armory
XRF Survey Data

Date	Shot #	Room	Component	Wall	Substrate	Color	Condition	XRF Reading	Classification	Sample ID
7/28	53	Garage exit	Door	4	Metal	Yellow	Fair	1.7	Positive	
7/28	54	Garage exit	Safety corner	4	Metal	Yellow	Fair	7.0	Positive	
7/28	55	Garage exit	Safety corner	4	Metal	Green	Fair	5.7	Positive	
7/28	56	Garage exit	Door	4	Metal	Green	Fair	1.7	Positive	
7/28	57	Garage exit	Door case	4	Metal	Green	Fair	>9.9	Positive	
7/28	58	Garage exit	Window guard	4	Metal	Green	Fair	2.4	Positive	
7/28	59	Garage exit	Drain pipe	4	Metal	Green	Fair	0.1		
7/28	60	Garage exit	Pipe riser	4	Metal	Green	Fair	0.6		
7/28	61	Calibrate						1.8		
7/28	62	Calibrate						1.7	Avg. 1.8	
7/28	63	Calibrate						1.9		

ATC ASSOCIATES, INC
104 E 25th Street, 10th Floor
New York, NY 10010
Tel. 212-353-8280
Fax 212-353-8306

REPORT DATE: 08-14-00

CLIENT: ET Environmetal

PROJECT No: 75018.0001

SAMPLED BY: F. Burkhardt

SAMPLE DATE: 08-11-00
DATE RECEIVED: 08-13-00
DATE ANALYZED: 08-13-00

SAMPLE MEDIA: Paint Chips
ANALYSIS REQUIRED: Method EPA 3050/7420

ANALYSIS RESULTS

SAMPLE ID	BATCH NO.	SAMPLE DESCRIPTION	LEAD CONCENTRATION (% by weight)	DETECTION LIMIT
1	8583	Rifle. R. - Aband.	0.07	0.01
2	8583	Rifle R. - Active	0.04	0.01
3	8583	Pistol 1-4	1.17	0.01
4	8583	Pistol 9-12	56.67	0.01
C-1	8583	Steel Truss	32.21	0.01
C-2	8583	Steel Truss	39.68	0.01
C-3	8583	Steel Truss	16.56	0.01
C-4	8583	Steel Truss	21.66	0.01
C-5	8583	Steel Truss	8.92	0.01
C-6	8583	Steel Truss	0.46	0.01

NOTE 1:
THE REPORTING LIMIT (RL) IS 0.01%

NOTE 2:
HUD defines lead-based paint as paint having a lead concentration equal to or above 0.5% by weight.
Results preceded by "<" are below the detectable levels by this analysis method.

ATC ASSOCIATES, INC
104 E 25th Street, 10th Floor
New York, NY 10010
Tel. 212-353-8280
Fax 212-353-8306

CERTIFICATION AND SIGNATURES

ANALYSIS PERFORMED BY: TL

REPORT PREPARED BY: [signature]

ATC certifies that this report is an accurate and authentic report of results obtained from the laboratory analysis.

QUALITY ASSURANCE COORDINATOR: [signature]

LABORATORY DIRECTOR: [signature]

ATC is accredited by the New York State Department of Health Environmental Laboratory Approval Program (NYS DOH ELAP) to perform analysis of lead in paint and dust wipes (ELAP #10879).

ASSOCIATES INC.

104 EAST 25TH STREET
NEW YORK, NY 10010
PHONE: 212-353-8280 FAX: 212-979-8447

8582

CHAIN OF CUSTODY

CLIENT NAME: ET ENVIRONMENTAL

SITE ADDRESS: KINGS BRIDGE ARMORY

JOB #: 75018.0001

SAMPLE TYPE (Paint Chip, Dust Wipe, etc...): CHIP / GRAB

OF SAMPLES: 10

SAMPLED BY: F. BURICHART

ANALYSIS REQUIRED (AAS-mg/sq.cm, etc...): PD-AAS % WT

TURN AROUND TI: SAME DAY

	SAMPLE I.D.	DATE	SAMPLE DESCRIPTION/LOCATION	AREA (in x in)	D.L.	RESULT OF ANAL
1	1	8/11	RIFLE RANGE - ABANDONED	N/A		
2	2	"	" - ACTIVE	"		
3	3	"	PISTOL 1-4	"		
4	4	"	PISTOL 9-12	"		
5	C-1	"	STEEL TRUSS	"		
6	C-2	"	"	"		
7	C-3	"	"	"		
8	C-4	"	"	"		
9	C-5	"	"	"		
10	C-6	8/11	"	"		
	--			N/A		

RELINQUISHED BY (SIGNATURE BELOW)

PRINT NAME: (BELOW) F. BURICHART

DATE/TIME 8/14

RECEIVED BY: (SIGNATURE BELOW)

PRINT NAME: (BELOW) J. MAPP

DATE/TIME 8/15/00 10 a.m.

RELINQUISHED BY (SIGNATURE BELOW)

PRINT NAME: (BELOW)

DATE/TIME

RECEIVED BY: (SIGNATURE BELOW)

PRINT NAME: (BELOW)

DATE/TIME

REPORTING PROVIDED BY:

LABORATORY DIRECTOR (SIGNATURE)

PRINT NAME: (BELOW)

DATE/TIME

AIHA NLLAP #

ATC ASSOCIATES, INC
104 E 25th Street, 10th Floor
New York, NY 10010
Tel. 212-353-8280
Fax 212-353-8306

REPORT DATE: 07-31-00

CLIENT: ET

PROJECT ADDRESS: Kingsbridge Armory

SAMPLE BY: M. Medinets

SAMPLE DATE: 07-24-00
DATE RECEIVED: 07-28-00
DATE ANALYZED: 07-28-00

SAMPLE MEDIA: Paint Chips
ANALYSIS REQUIRED: Method EPA 3050/7420

ANALYSIS RESULTS

SAMPLE ID	BATCH NO.	SAMPLE DESCRIPTION	LEAD CONCENTRATION (% by weight)	DETECTION LIMIT
01	8553	Stair Tread Sub. Bsmt. (Boiler Room)	0.13	0.01
02	8553	Control Panel Rm #3 Boiler Room	0.01	0.01
03	8553	Rm 4 Basment C16 Mez. Door	1.38	0.01

NOTE 1:
THE REPORTING LIMIT (RL) IS 0.01%

NOTE 2:
HUD defines lead-based paint as paint having a lead concentration equal to or above 0.5% by weight.
Results preceded by "<" are below the detectable levels by this analysis method.

CERTIFICATION AND SIGNATURES

ANALYSIS PERFORMED BY: _____

REPORT PREPARED BY: _____

ATC certifies that this report is an accurate and authentic report of results obtained from the laboratory analysis.

QUALITY ASSURANCE COORDINATOR: _____

LABORATORY DIRECTOR: _____

ATC is accredited by the New York State Department of Health Environmental Laboratory Approval Program (NYS DOH ELAP) to perform analysis of lead in paint and dust wipes (ELAP #10879).

ATC ASSOCIATES INC.
PAINT CHIP SAMPLING - CHAIN OF CUSTODY
194 EAST 25TH STREET, 10TH FLOOR
NEW YORK, NEW YORK 10010
PHONE: 212-353-8289 FAX: 212-979-8447

S553

PAGE___OF___
TOTAL # OF SAMPLES:___

ient Name: E T
Client Number: _____
Date: 7. 24. 00
oject Address: Kingsbridge Armory
Project Manager: F. Beurkhardt
Turnaround Time: 24h
vestigator: _____
Room Number: _____
Required: % by weight

Sample Number	Component & Location	Condition of Paint Surface	Substrate	Surface Paint Color	Type of Structure	Detection Limit	Pb % by Weight
01	Stair tread Sub BSM (Boiler Room)	___ Intact ___ Fair ✓ Poor	___ Sheetrock ___ Wood ✓ Metal ___ Masonry ___ Plaster___ Other	gray	___ Steel Structure ✓ Commercial ___ Industrial ___ Residential	0.01	0.13
02	control panel R#3 boiler room	___ Intact ___ Fair ✓ Poor	___ Sheetrock ___ Wood ✓ Metal ___ Masonry ___ Plaster___ Other	gray	___ Steel Structure ✓ Commercial ___ Industrial ___ Residential	0.01	0.01
03	R#4 BSM C. 16 Mez Door	___ Intact ___ Fair ✓ Poor	___ Sheetrock ___ Wood ✓ Metal ___ Masonry ___ Plaster___ Other	gray	___ Steel Structure ___ Commercial ___ Industrial ___ Residential	0.01	1.38
		___ Intact ___ Fair ___ Poor	___ Sheetrock ___ Wood ___ Metal ___ Masonry ___ Plaster___ Other		___ Steel Structure ___ Commercial ___ Industrial ___ Residential		
		___ Intact ___ Fair ___ Poor	___ Sheetrock ___ Wood ___ Metal ___ Masonry ___ Plaster___ Other		___ Steel Structure ___ Commercial ___ Industrial ___ Residential		

OMMENTS: _____

LINQUISHED BY (SIGNATURE BELOW):	DATE/TIME	RECIEVED BY (SIGNATURE BELOW):	DATE/TIME:	LABORATORY:	
R. Medrick	7.28.00	AM 07/28 9 pm			
INT NAME:	DATE/TIME	PRINT NAME:	DATE/TIME:	NLLAP#	ELAP#

CHAIN OF CUSTODY RECORD

WORK ORDER NO. _____

SCILAB

SCILAB BOSTON, INC.

8 School Street Weymouth, MA 02189-8951
781 337-9334 / FAX 781 337-7642

DUE DATE _____

COMPANY: ATC ASSOCIATES
104 EAST 25TH ST - 10TH FL
NY, NY 10010

PHONE: 212-353-8780 FAX #: 212-353-8306

P.O.#: 75010-1

CLIENT CONTACT: _____

PROJECT #: KINGSBRIDGE ARMORY

SAMPLE TYPE
1. WATER 6. WIPES
2. SOIL 7. AIR CASSETTE
3. SLUDGE 8. OTHER
4. OIL
5. CHIPS

CONTAINER TYPE
P - PLASTIC
G - GLASS
V - VOA

SCILAB SAMPLE #	CLIENT SAMPLE IDENTIFICATION	SAMPLE TYPE	CONTAINER SIZE	CONTAINER TYPE	CONTAINER #	SAMPLING INFORMATION DATE	TIME	TECH	PRESERVATIVES	TCLP LEAD	SAMPLE pH at login
	1	2		P						X	
	2	2		P						X	
	3	2		P						X	
	4	2		P						X	

REPORT PACKAGES
- MWRA ☐
- MA DEP ☐
- RDR ☐
- ASP A ☐
- ASP B ☐
- QC LEVEL 1 ☐
- QC LEVEL 2 ☐

SAMPLED BY: T. Burke

RELINQUISHED BY: FEDEX 8198 2057 4640

RELINQUISHED BY: T. Burke

RELINQUISHED BY: _____

DATE: 8/11/00	RECEIVED BY	DATE:	
TIME: 1100		TIME:	
DATE: 8/11/00	RECEIVED BY	DATE:	
TIME: 1700		TIME:	
DATE:	RECEIVED BY	DATE:	
TIME:		TIME:	

Temperature upon receipt _____

SPECIAL INSTRUCTIONS

☐ 24 HOUR TAT ☐ 72 HOUR TAT

☒ 48 HOUR TAT ☐ 5 DAY TAT

Shade area for ... Gold copy - ... Pink copy - ... Ivory use only. Remains ...

TOTAL P.02

ATC ASSOCIATES INC.

PAINT CHIP SAMPLING - CHAIN OF CUSTODY

104 EAST 25TH STREET, N[illegible] FLOOR
NEW YORK, NEW YORK 10010
PHONE: 212-353-8280 FAX: 212-979-8447

TOTAL # OF SAMPLES: 3

Name: ET

Client Number:

Date: 7.24.00

Address: Kingsbridge Armory

Project Manager: F. Burkhardt

Turnaround Time: 24h

gator:

Room Number:

Required: % by weight

ıple ıber	Component & Location	Condition of Paint Surface	Substrate	Surface Paint Color	Type of Structure	Detection Limit	Pb % by Weight
1	Stair tread Sub bsm (Boiler Room)	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential		
2	Control panel R#3 boiler room	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential		
3	R#4 BSM C 16 Mez Door	Intact / Fair / ✓ Poor	Sheetrock / Wood / ✓ Metal / Masonry / Plaster Other	gray	Steel Structure / ✓ Commercial / Industrial / Residential		
		Intact / Fair / Poor	Sheetrock / Wood / Metal / Masonry / Plaster Other		Steel Structure / Commercial / Industrial / Residential		
		Intact / Fair / Poor	Sheetrock / Wood / Metal / Masonry / Plaster Other		Steel Structure / Commercial / Industrial / Residential		

ITS:

HED BY (SIGNATURE BELOW): DATE/TIME	RECIEVED BY (SIGNATURE BELOW):	DATE/TIME:	LABORATORY:	
Medi web 7.28.00				
E: DATE/TIME	PRINT NAME:	DATE/TIME:	NLLAP#	ELAP#

APPENDIX B

Health and Safety Plan

HEALTH AND SAFETY PLAN

FOR

KINGSBRIDGE ARMORY
1 WEST KINGBRIDGE ROAD
BRONX, NEW YORK
Bronx Borough/County Tax Map
Block 3247, Lot 10

Prepared for

8th Regiment Partners LLC
600 Third Avenue, 18th Floor
New York, New York

Prepared by:

Langan Engineering, Environmental, Surveying
Landscape Architecture and Geology
368 Ninth Avenue, 8th Floor
New York, New York 10001

LANGAN

May 2026
Langan Project No. 170900201

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***** Items to be posted prominently on-site or made readily available to personnel.

1.0 INTRODUCTION

1.1 General

This HEALTH AND SAFETY PLAN (HASP) was developed to address disturbance of known and reasonably anticipated subsurface contaminants and comply with Occupational Safety and Health Administration (OSHA) Standard 29 Code of Federal Regulation (CFR) 1910.120(b)(4), Hazardous Waste Operations and Emergency Response during anticipated site work for the property identified as the Kingsbridge Armory located on 1 West Kingsbridge Road in the Kingsbridge Heights neighborhood of the Bronx, New York City (the "Site"). The site is identified on the Bronx Borough/County Tax Map as Block 3247, Lot 10.

This HASP provides the minimum requirements for implementing site operations during future remedial measures. All contractors performing work on this site must implement their own HASP that, at a minimum, adheres to this HASP. The contractor is responsible for their own health and safety and that of their subcontractors. Langan personnel will implement this HASP while onsite.

The content of this HASP may change or undergo revision based upon additional information made available to health and safety personnel, monitoring results, or changes in the work plan.

1.2 Site Location and Background

The 5.6-acre site is identified on the Bronx Borough Tax Map as Block 3247, Lot 10. The site is developed with an approximately 200,000-square-foot, multi-story former military facility (armory building) on most of the property. The remainder of the property comprises access roadways, concrete and asphalt-paved areas, and landscaped areas to the north, west and south of the building.

The interior of the armory building consists of a central drill hall at ground level with an arched framing roof that extends about 110 feet above the floor of the drill hall. Beneath the drill hall are two cellar levels which formerly included offices, a garage and vehicle storage area, a gymnasium, rifle and pistol ranges, and other ancillary rooms. In the southern part of the building, a crawl space is present at the sub-cellar level. Above the drill hall there are four five-story towers in the southern part of the building, which previously contained offices and residential quarters. A site location map is provided as Figure 1.

The site was developed as early as 1896 as part of the Jerome Park Reservoir. Construction of the Kingsbridge Armory building began in 1912 and was completed in 1917. The property has remained in a similar configuration through the present day. The armory building was operated

by the New York National Guard 258th Field Artillery Unit from its construction until 1984, when the unit was relocated to the northern adjoining property building. A portion of the property was occupied by the New York City Community Assistance Unit, Anti-Graffiti Task Force for parking and office space from about 1984 through the early 2000s.

1.3 Summary of Work Tasks

1.3.1 Geophysical Investigation - Underground Utility Clearance Policy

Prior to the commencement of intrusive field activities (i.e., all soil boreholes, test pits, or excavations); Langan field engineers will follow the Langan Underground Utility Clearance Policy including the retaining one or more geophysical consultants, if required, to conduct geophysical surveys using ground penetrating radar (GPR) and electromagnetic detection equipment. The application of the Langan Underground Utility Clearance policy is mandatory unless a site wide or a specific location exemption has been granted in writing by the principal-in-charge (PIC).

The objective of a geophysical survey is to identify any underground storage tank (UST) structures, drains, underground utilities, and other subsurface anomalies that may be encountered during an intrusive investigation. Langan personnel will observe the geophysical survey of each location and confirm the locations are both accessible and free of potential utility or other known or suspected subsurface structures. There will be no exemption to this section unless granted by written approval by the PIC.

1.3.2 "Soft-Dig" Clearance of Borehole Locations

In accordance with Langan's Underground Utility Clearance Policy, Langan will instruct the drilling or excavation contractor to "Soft-Dig" each target soil boring, test pit, or excavation location as specified in Section 1.3.1. Soft dig is defined as using a vacuum system (with or without an air knife) or hand auger to clear soil from the proposed soil boring location to a depth of 5-feet. When excavating a test pit or larger excavation, the exaction contractor will "peal" away thin layers of soil with their excavator or shovel to daylight potential underground structures until achieving the required 5-feet depth. If using an excavator, the contractor must have a worker observing the excavator bucket/shovel warning the operator when the bucket/shovel encounters a possible underground structure. At which point, the potential structure must be hand shoveled until it is fully daylighted. Langan personnel will confirm that the "soft dig" activities are completed to these specifications.

1.3.3 Day Lighting Excavation and Soil Screening

Langan may retain one or more excavation contractors to daylight buried unidentified structures. The purpose of the daylighting is to confirm if these structures are subsurface structures of concern including USTs, utilities sewer lines, storm water drains, electrical, gas or other utility line as well as other artifacts pertinent to the work plan. The excavation contractors will contact the appropriate utility mark-out authority and make available to their staff the verification number and effective dates.

The excavation contractor will employ "soft dig" methods as defined in Section 1.3.2. Langan may screen excavated soil for visual, olfactory, and instrumental indicators suggestive of a potential chemical or petroleum release. Instrument screening for the presence of volatile organic compounds (VOC) may be performed with a duly calibrated photoionization detector (PID). Contractors will notify Langan personnel if they identify indications suggestive of a potential chemical or petroleum release. Contaminated material shall be handled, and property disposed in accordance with federal, state and city regulations, criteria, and guidelines.

1.3.4 Soil Investigation and Sampling

Langan may retain a drilling contractor to advance soil boreholes to a depth below grade surface (bgs) specified in the work plan. Borings will be installed at the approximate locations indicated in Langan's work plan but may be moved in the field based on utility clearance and accessibility. The drilling contractor will contact the appropriate utility mark-out authority and make available to their drilling staff the verification number and effective dates. Langan will record the verification number and effective dates from the drillers. Langan will also note the location of marked out utilities on the site plan and scan the data into the project folder.

Langan personnel will screen soil for visual, olfactory, and instrumental indicators suggestive of a potential petroleum release. Instrument screening for the presence of VOC may be performed with a duly field calibrated PID (or equivalent). Langan personnel will collect soil samples from the proposed locations following the sampling plan outlined in the work plan. The borings will be filled with clean soil cuttings, clean sand or bentonite grout and capped at grade to match the surrounding surface after samples are collected.

Soil samples will be submitted to a specific lab per the work plan or to a New York State Department of Health (NYSDOH) Environmental Laboratory Approval Program (ELAP)-certified laboratory and analyzed in accordance with work plan specifications.

1.3.5 Test Pits

Langan may retain an excavation contractor to advance test pits to a depth bgs specified in the work plan. Locations will be based on the results of the geophysical survey, the site inspection and document review. The excavation contractor is responsible for all permits and will contact the appropriate utility mark-out authority and make available to their staff the verification number and effective dates.

The excavation contractor may be required to use a bladed equipped excavation bucket. Langan personnel will confirm this and observe the test pit excavation noting foundation and soil attributes as required by the work plan. Langan personnel will screen soil for visual, olfactory, and instrumental indicators suggestive of a potential petroleum release. Instrument screening for the presence of VOC may be performed with a duly field calibrated PID (or equivalent). Langan personnel will collect soil samples from the proposed locations following the sampling plan outlined in the work plan. The test pit will be filled with clean soil cuttings, clean sand or bentonite grout and capped at grade to match the surrounding surface after samples are collected.

Soil samples will be submitted to a specific lab per the work plan or to NYSDOH ELAP-certified laboratory and analyzed in accordance with work plan specifications..

1.3.6 Groundwater Investigation and Sampling

Langan may complete a groundwater investigation. Langan may sample existing monitoring wells, or those soil investigation borings converted into groundwater monitoring wells. Groundwater samples will be collected from one or more of the new and if available, pre-existing monitoring wells in accordance with the Langan Low Flow Groundwater Sampling SOP (SOP #12). Groundwater samples will be submitted to an approved laboratory and analyzed for constituents as specified in the work plan. Temporary monitoring wells will be plugged and abandoned during the investigation in the manner defined in the work plan. Permanent monitoring wells will be completed with a road box set in concrete. Permanent monitoring wells will be eventually backfilled and abandoned in accordance with State and Local regulations.

Groundwater samples will be submitted to a NYSDOH ELAP-certified laboratory and analyzed in accordance with work plan specifications.

1.3.7 Groundwater/Product Gauging

Langan may gauge one or more of the observation/monitoring wells to collect synoptic head data or determine the presence of product. When gauging, Langan may also survey head

space VOCs within the well using a duly calibrated PID. When collected, gauging data will be based on the northernmost point at top of casing (TOC) using an interface probe (IP) capable of determining the presence of free product in the monitoring well as light non-aqueous phase liquid (LNAPL) at the top of the water column. If gauging for dense non-aqueous phase liquid (DNAPL) at the base of the monitoring well, the IP may not be appropriate. The field engineer will coordinate with the project team to devise an alternative method to gauge the thickness of DNAPL at base of the well. Langan will decontaminate gauging equipment between wells as required by the work plan.

1.3.8 Product Bailing

If free product is observed in any of the monitoring wells, Langan may bail or contract a 3rd part to remove free product from on-site monitoring wells as part of the work plan. Langan or its contractor may use a dedicated bailer or similar device, peristaltic pump or submersible to extract the observed free product. Langan will record the volume of product and groundwater recovered. Recovered free product and groundwater will be drummed and handled in accordance with procedures outlined in the work plan.

1.3.9 Sub Slab or Soil Vapor Point Installation and Sampling

Langan (or its contractor) may install one or more sub-slab or soil vapor points at selected locations. If installed, the sub-slab points will be set at or just below the bottom of the slab in accordance with the work plan. The sub-slab points may be installed using an electric hammer drill to advance small diameter boreholes through the concrete (or equivalent) slab as defined in the work plan. The borings will terminate in and sample from the gravel substrate below the slab. Conditions in the field may require adjustment of sampling locations.

Langan personnel (or contractor) may install VaporPin® vapor points (or equivalent) in accordance with the manufacturer's instructions. If no point is used, Langan (or contractor) will set a sampling tube defined as an open-ended Teflon™-lined polyethylene tubing (or equivalent tubing as approved by the project manager [PM]). The sampling tube will be set either within the base of the concrete slab or within the support gravel underlying the slab.

When using the VaporPin® or equivalent, the installation sleeve will provide the necessary annulus seal required for subsequent sampling. However, if a sampling tube as defined above is used, the annulus at the top of the concrete slab will be filled with bentonite or food grade clay to seal the slab. A sand pack is not required for sub-slab vapor sampling. Unless specified by the work plan, the sub slab points are temporary and will be pulled after the sampling event and the hole will be patched at grade with material like the surrounding surface.

Langan personnel will confirm that the soil vapor points (implants) are 2-inches in length constructed of polyethylene material and are connected to the surface by Teflon™-line polyethylene material (equivalent materials for the point and tubing are acceptable as approved by the PM). The annulus around the implant will be filled with clean sand to 6-inches above the implant. A 1-foot bentonite slurry will be applied to the top of the sand up to seal the sampling points. The remaining soil vapor point annulus may be backfilled with clean cuttings are sand to grade. Unless specified by the work plan, the vapor points are temporary and will be pulled after the sampling event and the hole will be patched at grade with material like the surrounding surface.

Vapor samples will be collected in accordance with following guidance including Final Guidance for Evaluating Soil Vapor Intrusion published by the New York State Department of Health (NYSDOH) in October 2006, Langan's Sub-Slab Vapor Sampling SOP (SOP #14) and as specified in the work plan. In addition, ambient air and indoor air samples may be collected for use as a comparison sample. As part of the indoor air sampling program, Langan personnel may complete a building inventory inspection. The inspection may take place prior to the commencement of actual field sampling. Vapor samples may be submitted to a NYSDOH ELAP-certified laboratory and analyzed in accordance with work plan specifications.

1.3.10 Observation/Monitoring Well Plugging and Abandonment

While not scheduled, existing observation/monitoring wells may be plugged or abandoned as specified in the work plan. Plugging and abandonment will be in accordance with federal and state requirements. Langan may retain a drilling contractor to complete the plugging and abandonment activities. The contractor will contact the appropriate utility mark-out authority and make available to their field staff the verification number and effective dates. Langan may observe the plugging and abandonment of one or more observation/monitoring wells to document that the plugging and abandonment activities were completed in accordance with the work plan and regulations.

1.3.11 QA/QC Sampling

Samples for quality assurance/quality control [QA/QC] may also be collected and submitted to an approved laboratory and analyzed in accordance with work plan specifications. Information regarding the QA/QC samples including required method of analysis may be included in the same COC as the soil samples unless otherwise instructed by the work plan.

1.3.12 Equipment Decontamination

Before the start of the day's sampling and after sampling each run, sampling equipment will be decontaminated by the decontamination process outlined Attachment B - Decontamination Procedures. Decontamination waste and purge water will be temporarily stored on site pending analytical results.

1.3.13 Management of Investigative-Derived Waste

The investigative-derived waste (IDW) generated during this investigation will be contained in DOT-approved 55-gallon drums. The drums will be temporarily stored on the site or as directed by the client representative. All drums will be filled between two-thirds full to allow easy maneuvering during drum pickup and disposal. Drum labels are to be provided by Langan (Environmental Closet). All drums will be labeled as "IDW Pending Analysis" until sample data are reported from the laboratory. Drum labels will include date filled and locations where waste was generated along with the standard information required by the labels in accordance with the Langan SOP09, Drum Labeling.

Closed top drums are to be used to store liquids. Debris, including plastic sheeting, polyethylene tubing, personal protection equipment (PPE), decontamination debris, etc. will be segregated from and disposed of in large heavy duty garbage bags and disposed of at the site. Excess unused glassware should be returned to the lab along with the last day of collection samples.

1.3.14 Drum Sampling

Langan personnel may collect drum samples, as required, prior to off-site drum disposal. Samples will be placed into laboratory-supplied batch-certified clean glassware and submitted to an approved laboratory and analyzed in accordance with work plan specifications, if required.

1.3.15 Surveying

Surveying activities may be completed by Langan. Surveying will be conducted by licensed surveyors.

2.0 IDENTIFICATION OF KEY PERSONNEL/HEALTH AND SAFETY PERSONNEL

The following briefly describes the health and safety (H&S) designations and general responsibilities that may be employed for this site. The titles have been established to accommodate the project needs and requirements and ensure the safe conduct of site activities.

The H&S personnel requirements for a given work location are based on the proposed site activities.

2.1 Langan Project Manager

The Langan Environmental Project Manager (PM) is Kristen Wexler, her responsibilities include:

- Ensuring that this HASP is developed, current, and approved prior to on-site activities.
- Ensuring that the tasks in the project are performed in a manner consistent with Langan's comprehensive *Health and Safety Program for Hazardous Waste Operations* and this HASP.

2.2 Langan Corporate Construction Health and Safety Manager

The Langan Corporate Construction Health and Safety Manager is Tony Moffa. His responsibilities include:

- Updating the *Health and Safety Program for Hazardous Waste Operations*.
- Assisting the site Construction Health and Safety Officer (HSO) with the development of the HASP, updating HASP as dictated by changing conditions, job site inspection results, etc., and approving changes to this HASP.
- Assisting the HSO in the implementation of this HASP and conducting Jobsite Safety Inspections and assisting with communication of results and correction of shortcomings found.
- Maintaining records on personnel (medical evaluation results, training and certifications, accident investigation results, etc.).

2.3 Langan Site Health & Safety Officer

The Langan site HSO is William Bohrer. His responsibilities include:

- Participating in the development and implementation of this HASP.
- When on-site, assisting the Langan Field Team Leader in conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- Ensuring that proper PPE is available, worn by employees, and properly stored and maintained.
- Controlling entry into and exit from the site contaminated areas or zones.
- Monitoring employees for signs of stress, such as heat stress, fatigue, and cold exposure.
- Monitoring site hazards and conditions.

- Knowing (and ensuring that all site personnel also know) emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department.
- Resolving conflicts that may arise concerning safety requirements and working conditions.
- Reporting all incidents, injuries, and near misses to the Langan Incident/Injury Hotline immediately and the client representative.

2.4 Langan Field Team Leader Responsibilities

The Langan Field Team Leader (FTL) is to be determined prior to the start of field activities. The Field Team Leader's responsibilities include:

- The management of the day-to-day site activities and implementation of this HASP in the field.
- Participating in and/or conducting Tailgate Safety Meetings and Jobsite Safety Inspections and correcting any shortcomings in a timely manner.
- When a Community Air Monitoring Operating Program (CAMP) is part of the scope, the FTL will set up and maintain community air monitoring activities and instruct the responsible contractor to implement organic vapor or dust mitigation when necessary.

2.5 Contractor Responsibilities

2.5 Contractor Responsibilities

The contractor must develop and implement their own HASP for their employees, their subcontractors, and consultants. The contractor is responsible for their own health and safety and that of their subcontractors. Contractors operating on the site must designate their own FTL, HSO, and Health and Safety Manager (HSM). The contractor's HASP will be at least as stringent as this HASP. The contractor must be familiar with and abide by the requirements outlined in their own HASP. A contractor may elect to adopt Langan's HASP as its own if it has given written notification to Langan, but where Langan's HASP excludes provisions pertinent to the contractor's work (i.e., confined space entry); the contractor must provide written addendums to this HASP. Additionally, the contractor must:

- Ensure their employees are trained in the use of all appropriate PPE for the tasks involved.
- Notify Langan of any hazardous material brought onto the job site or site-related area, the hazards associated with the material and must provide a safety data sheet (SDS) for the material.
- Have knowledge of, understand, and abide by all current federal, state, and local health

and safety regulations pertaining to the work.

- Ensure their employees handling hazardous materials, if identified at the Site, have received current training at the appropriate levels of 29 CFR 1910.120, *Hazardous Waste Operations and Emergency Response* (HAZWOPER) if hazardous waste is identified at the Site,
- Ensure their employees handling hazardous materials, if identified at the Site, have been fit-tested within the year on the type of respirator they will wear.
- Ensure all air monitoring is in place pertaining to the health and safety of their employees as required by OSHA 1910.120; and
- All contractors must adhere to all federal, state, and local regulatory requirements.

3.0 TASK/OPERATION SAFETY AND HEALTH RISK ANALYSES

A Task-Hazard Analysis (Table 1) was completed for general hazards that may be encountered at the Site. The potential contaminants that might be encountered during the field activities and the exposure limits are listed in Table 2. The Safety Data Sheets for each potential contaminant listed in Table 2 are included in Attachment E.

3.1 Specific Task Safety Analysis

3.1.1 Geophysical Survey

Langan personnel are not permitted to operate or otherwise handle geophysical equipment including GPR/electromagnetic detection equipment used for surface utility clearance. When conducting surface utility clearance surveys, the locations of the boreholes, test pits, and other excavations must be fully marked out. In addition, possible detections by the utility clearance contractor of utilities and other artifacts must also be marked out. Markings should include paint, flags, or color tape (when marking indoor locations that the client has specifically requested not be marked with paint). This information must also be added to the site map.

3.1.2 "Soft Dig" Clearance of Borehole Locations

"Soft-Dig" clearance will be completed by the contractors. Langan personnel are not permitted to operate or otherwise handle the contractor's equipment. Langan will update the site map to include the locations of the cleared borehole locations as well as utilities and other artifacts that may interfere with the subsurface investigation.

3.1.3 Daylighting Test Pit

Excavation daylighting must abide by OSHA excavation standards (Part 1926.651) and conform

to the Langan Underground Utility Clearance Policy. Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence.

No one is to enter an excavation deeper than 5 feet unless the excavation walls are properly sloped in accordance with OSHA regulations. If sampling is required, the sample for excavations deeper than 5 feet without protective systems (sloping) as defined by OSHA are to be collected using suitable mechanical excavation equipment (backhoe or equivalent). When collecting soil samples, Langan will wear chemical resistant gloves in addition to the standard PPE. Langan personnel do not operate excavation equipment. This task is to be completed by an authorized operator approved by the contractor.

3.1.4 Indoor Drilling and Excavation

The work scope may require indoor excavation where there may not be adequate ventilation sufficient to safely operate any rig or excavation equipment powered by an internal combustion engine. Where possible, all such work should be done with equipment powered by electricity. If such equipment is used and must be directly connected to the building's electrical system or to an independent system, this work must be completed by a licensed electrician in accordance with all electrical codes applicable to the work.

Indoor work which is to be completed with equipment powered by an internal combustion engine must incorporate air monitoring for carbon monoxide (CO) using calibrated air monitoring equipment (MultiRAE or equivalent). In addition, the work plan should incorporate mitigation for venting engine exhaust fumes directly to the outdoors and for circulating fresh air into the work area.

The OSHA Time Weighted Average (TWA) Permissible Exposure Limit (PEL) for CO from 50 to 35 parts per million (ppm). Langan will monitor CO with a suitable monitoring device. If CO levels exceed 5 ppm, Langan will instruct contractors to begin mitigation measures. These measures are at a minimum:

- Increase air circulation using industrial size fans to bring additional fresh air into the building or vent exhaust to the outside.
- Modify the passive exhaust method being used to increase venting circulation by using wider diameter tubing or sealing tubing connections; or
- Modify the work schedule where the rig is turned off to allow time for CO levels to fall

back to background.

All work must cease if CO levels reach 35 ppm. The Langan engineer is to report to the PM and H&S officer when an action level is reached.

1.3.5 Investigation and Sampling

Sampling groundwater requires the donning of chemical resistant gloves in addition to the standard PPE and cut resistant gloves when cutting sampling-tubing to length. Langan personnel are not to operate drilling equipment nor assemble or install monitoring well equipment. These tasks are to be completed by the driller contractor.

3.1.6 Test Pit

Excavation test pits must abide by OSHA excavation standards (Part 1926.651). Daily inspections of excavations, the adjacent areas, and protective systems shall be made by a competent person for evidence of a situation that could result in cave-ins, indications of failure of protective systems, hazardous atmospheres, or other hazardous conditions. An inspection shall be conducted by the competent person prior to the start of work and as needed throughout the shift. Inspections shall also be made after every rainstorm or other hazard increasing occurrence.

No one is to enter an excavation deeper than 5 feet unless the excavation walls are properly sloped in accordance with OSHA regulations. If sampling is required, the sample for excavations deeper than 5 feet without protective systems (sloping) as defined by OSHA are to be collected using suitable mechanical excavation equipment (backhoe or equivalent). When collecting soil samples, Langan will wear chemical resistant gloves in addition to the standard PPE. Langan personnel do not operate excavation equipment. This task is to be completed by an authorized operator approved by the contractor.

Excavation and trenching completed under Langan personnel oversight requires:

- a competent person from the entity completing the excavation work be onsite during all active excavation work contractually under Langan control.
- site specific shoring, shielding, and/or sloping procedures are defined and followed.
- No Langan personnel or subcontractors are to enter an excavation unless sufficient controls and permits are in place where applicable.
- Site personnel are not permitted to work in or around excavations as a 'lone worker'.

Areas to be excavated shall be identified and segregated by means of barricades, ropes and/or

signs to prevent access of unauthorized personnel and equipment. Suitable means should be provided to always make barriers visible. Use warning systems such as mobile equipment, barricades, hand, or other mechanical signals or stop logs to alert equipment operators of the edge of an excavation. An excavation will not be conducted below the level of the base or footing of any foundation, retaining wall, sidewalk and/or pavement unless a support system such as underpinning is provided or another effective method is used, the excavation is stable rock, or a Registered Professional Engineer determines that the structure is sufficiently removed from the excavation, and that the excavation will not pose a hazard to personnel/employees.

1.3.7 Groundwater/Product Gauging

Gauging products require additional safety considerations including the presence of VOCs and protection of both field cloths and property. Langan will monitor air for VOCs using a duly calibrated PID. Langan will wear protective clothing including Tyvek® over-cloths, as necessary. To protect property, Langan will set a plastic barrier to protect floors or protect landscape and use absorbent pads as necessary to collect pooled separate phase liquid. If sampling for PFAS from the same well, Langan will complete the product check first, if the well can be sampled without including product, Langan will remove the Tyvek® material from the well head vicinity.

3.1.8 Product Recovery Well Bailing

Langan may bail separate phase liquid from monitoring wells. Langan will wear Tyvek™ suits, Tyvek™ boots and chemical resistant gloves in addition to the standard PPE for bailing and cut resistant gloves when cutting sampling-tubing to length. In addition, Langan will place plastic sheeting around the recovery well head to control spillage during product recovery. Langan will also keep on hand and readily available absorbing pads to use as needed.

3.1.9 Electrical Pumps

Langan may use an electric pump to collect separate phase liquid from the recovery wells or to sample groundwater. Langan will inspect the electric pump and control box prior to use and specifically note the condition of the electrical connectors, pump, control box and the electrical cord. The electrical connection must be grounded and connected to the power source using a functional three prong grounded plug. The power source must be a Ground Fault Circuit Interrupter (GFI or GFCI) receptacle.

3.1.10 Vapor Investigation and Sampling

Sampling vapor requires the donning of work gloves in addition to the standard PPE when assembling the Summa™ canister with the regulator and cut resistant gloves when cutting sampling- or silicone-tubing to length. Langan personnel are not to operate contractor equipment nor assemble or install the contractor vapor point sampling equipment unless instructed by the work plan. When not instructed by the work plan, these tasks are to be completed by the contractor.

3.1.11 Additional Vapor Screening

Langan personnel may prescreen vapor samples for volatile organic compounds (VOCs), methane, hydrogen sulfide and lower explosion limit (LEL) conditions using duly calibrated devices design to screen vapor for these parameters. Langan personnel may also perform atmospheric screening for LEL. Results of the screening may be used in determining which soil vapor samples will be submitted for analysis.

Work activities will immediately cease, and the work area is to be evacuated if the MultiRAE returns a reading of 10% of the LEL (an alarm will sound). Langan personnel will contact the

3.1.12 Plugging and Abandonment of Observation/Monitoring Wells

Langan personnel are not to operate equipment nor assist in the plugging and abandonment of the observation/monitoring wells. These tasks are to be completed by the contractor.

3.1.13 Drum Sampling

Drilling fluid, rinse water, grossly contaminated soil samples, and cuttings will be containerized in 55-gallon drums for disposal off-site. Each drum must be labeled in accordance with the Langan Drum Labeling Standard Operating Procedure (SOP09). Sampling drums requires the donning of work gloves when opening the drums and chemical resistant gloves when sampling in addition to standard PPE.

3.2 Radiation Hazards

No radiation hazards are known or expected at the site.

3.3 Physical Hazards

Physical hazards, which may be encountered during site operations for this project, are detailed in Table 1.

3.3.1 Explosion

No explosion hazards are expected for the scope of work at this site.

3.3.2 Heat Stress

The use of Level C protective equipment, or greater, may create heat stress. Monitoring of personnel wearing personal protective clothing should commence when the ambient temperature is 72^{O}F or above. Table 6 presents the suggested frequency for such monitoring. Monitoring frequency should increase as ambient temperature increases or as slow recovery rates are observed. Refer to Table 7 to assist in assessing when the risk for heat-related illness is likely. To use this table, the ambient temperature and relative humidity must be obtained (a regional weather report should suffice). Heat stress monitoring should be performed by the HSO or the FTL, who must be able to recognize symptoms related to heat stress.

To monitor the workers, be familiar with the following heat-related disorders and their symptoms:

- **Heat Cramps: Painful** spasms of arm, leg, or abdominal muscles, during or after work
- **Heat Exhaustion: Headache**, nausea, dizziness; cool, clammy, moist skin; heavy sweating; weak, fast pulse; shallow respiration, normal temperature
- **Heat Stroke**: Headache, nausea, weakness, hot dry skin, fever, rapid strong pulse, rapid deep respirations, loss of consciousness, convulsions, coma. *This is a life-threatening condition***.**

Do not permit a worker to wear a semi-permeable or impermeable garment when they are showing signs or symptoms of heat-related illness.

To monitor the worker, measure:

- **Heart rate: Count** the radial pulse during a 30-second period as early as possible in the rest period. If the heart rate exceeds 100 beats per minute at the beginning of the rest period, shorten the next work cycle by one-third and keep the rest period the same. If the heart rate still exceeds 100 beats per minute at the next rest period, shorten the following work cycle by one-third. A worker cannot return to work after a rest period until their heart rate is below 100 beats per minute.

- **Oral temperature: Use** a clinical thermometer (3 minutes under the tongue) or a similar device to measure the oral temperature at the end of the work period (before drinking). If oral temperature exceeds 99.6°F (37.6°C), shorten the next work cycle by one-third without changing the rest period. A worker cannot return to work after a rest period until their oral temperature is below 99.6°F. If oral temperature still exceeds 99.6°F (37.6°C) at the beginning of the next rest period, shorten the following cycle by one-third. Do not permit a worker to wear a semi-permeable or impermeable garment when oral temperature exceeds 100.6°F (38.1°C).

Prevention of Heat Stress - Proper training and preventative measures will aid in averting loss of worker productivity and serious illness. Heat stress prevention is particularly important because once a person suffers from heat stroke or heat exhaustion, that person may be predisposed to additional heat-related illnesses. To avoid heat-stress the following steps should be taken:

- Adjust work schedules.
- Mandate work slowdowns as needed.
- Perform work during cooler hours of the day if possible or at night if adequate lighting can be provided.
- Provide shelter (air-conditioned, if possible) or shaded areas to protect personnel during rest periods.
- Maintain worker's body fluids at normal levels. This is necessary to ensure that the cardiovascular system functions adequately. Daily fluid intake must equal the amount of water lost in sweat, i.e., eight fluid ounces (0.23 liters) of water must be ingested for every eight ounces (0.23 kilograms [kg]) of weight loss. The normal thirst mechanism is not sensitive enough to ensure that enough water will be drunk to replace lost sweat. When heavy sweating occurs, encourage the worker to drink more. The following strategies may be useful:
    - Maintain water temperature 50° to 60°F (10° to 16.6°C).
    - Provide small disposal cups that hold about four ounces (0.1 liters).
    - Have workers drink 16 ounces (0.5 liters) of fluid (preferably water or dilute drinks) before beginning work.
    - Urge workers to drink a cup or two every 15 to 20 minutes, or at each monitoring break. A total of 1 to 1.6 gallons (4 to 6 liters) of fluid per day are recommended, but more may be necessary to maintain body weight.
    - Train workers to recognize the symptoms of heat-related illness.

3.3.3 Cold-Related Illness

If work on this project begins in the winter months, thermal injury due to cold exposure can become a problem for field personnel. Systemic cold exposure is referred to as hypothermia. Local cold exposure is called frostbite.

- **Hypothermia -** Hypothermia is defined as a decrease in the patient's core temperature below 96^{O}F. The body temperature is normally maintained by a combination of central (brain and spinal cord) and peripheral (skin and muscle) activity. Interference with any of these mechanisms can result in hypothermia, even in the absence of what normally is considered a "cold" ambient temperature. Symptoms of hypothermia include shivering, apathy, listlessness, sleepiness, and unconsciousness.
- **Frostbite -** Frostbite is both a general and medical term given to areas of local cold injury. Unlike systemic hypothermia, frostbite rarely occurs unless the ambient temperatures are less than freezing and usually less than 20^{O}F. Symptoms of frostbite are sudden blanching or whitening of the skin; the skin has a waxy or white appearance and is firm to the touch; tissues are cold, pale, and solid.

Prevention of Cold-Related Illness - To prevent cold-related illness:

- Educate workers to recognize the symptoms of frostbite and hypothermia.
- Identify and limit known risk factors:
- Assure the availability of an enclosed, heated environment on or adjacent to the site.
- Assure the availability of dry changes of clothing.
- Assure the availability of warm drinks.
- Start (oral) temperature recording at the job site:
- At the FSO or Field Team Leader's discretion when suspicion is based on changes in a worker's performance or mental status.
- At a worker's request.
- As a screening measure, two times per shift, under unusually hazardous conditions (e.g., wind chill less than 20^{O}F, or wind-chill less than 30^{O}F with precipitation).
- As a screening measure whenever anyone worker on the site develops hypothermia.

Any person developing moderate hypothermia (a core temperature of 92^{O}F) cannot return to work for 48 hours.

3.3.4 Noise

Work during the proposed activities may be conducted at locations with high noise levels from the operation of equipment. Hearing protection will be used, as necessary.

3.3.5 Hand and Power Tools

The use of hand and power tools can present a variety of hazards, including physical harm from being struck by flying objects, being cut, or struck by the tool, fire, and electrocution. All hand and power tools should be inspected for health and safety hazards prior to use. If deemed unserviceable/un-operable, notify the supervisor and tag and remove equipment out of service. Ground Fault Circuit Interrupters (GFCIs) are required for all power tools requiring direct electrical service.

3.3.6 Slips, Trips, and Fall Hazards

Care should be exercised when walking at the site, especially when carrying equipment. The presence of surface debris, uneven surfaces, pits, facility equipment, and soil piles contribute to tripping hazards and fall hazards. To the extent possible, all hazards should be identified and marked on the site, with hazards communicated to all workers in the area.

3.3.7 Utilities (Electrocution and Fire Hazards)

3.3.7.1 Utility Clearance

The possibility of encountering underground utilities poses fire, explosion, and electrocution hazards. All excavation work will be preceded by a review of available utility drawings and by notification of the subsurface work to N.Y. One –Call--Center.

3.3.7.2 Lockout-Tagout

The potential adverse effects of electrical hazards include burns, arc flashes, and electrocution, which could result in serious injury including death. Therefore, there is a procedure that establishes the requirements for the lockout/tag out (LOTO) of energy isolating devices in accordance with the OSHA electrical lockout and tagging requirements as specified in 29CFR1910.147 and 29 CFR 1926.417. This procedure will be used to ensure that all machines and equipment are isolated from potentially hazardous energy. If possible, equipment that could cause injury due to unexpected energizing, start-up, or release of stored energy will be locked/tagged, before field personnel performs work activities.

The facility owner/operator/representative is to be the authorized person that will initiate and perform the LOTO in accordance with applicable rules and practices. Inerting of electrical power

sources is to be completed by an authorized and licensed electrician. Langan personnel will follow LOTO protocols and practices including adding a separate lock/signature to the LOTO chain in accordance with said protocols and practices.

SPECIAL NOTE: Project personnel will assume that all electrical equipment at the surface, subsurface, and overhead locations are energized until equipment has been designated and confirmed as de-energized by a utility company representative. Langan will notify the designated utility representative prior to working adjacent to this equipment and will verify that the equipment is energized or de-energized in the vicinity of the work location. No project work shall be performed by Langan personnel or subcontractors near energized electrical lines or equipment.

The FTL shall accompany the designated facility owner/operator/representative or authorized/licensed electrician in surveying to locate and identify all energy-isolating devices. Langan will note which switches, valves or other isolating devices are used for inerting the equipment and how they are set assuring LOTO. The lockout/tagout procedure involves, but is not limited to, electricity, motors, steam, natural gas, compressed air, hydraulic systems, digesters, sewers, etc.

3.3.8 Adequate Lighting

Indoor or night activities must be done under adequate lighting conditions. The Langan field engineer must be able to clearly see the equipment, all controls and have sufficient lighting to detail color labels. Battery operated lights are sufficient provided they cast a wide enough field to provide the required lighting and there are back-up batteries and emergency flashlights available. Electrically powered lights are suitable provided the electrical source is equipped with a ground fault interrupt circuit (GFIC) and the extensions cords are visually inspected prior to each use, and not used if they show cracked, damaged, or missing insulation. If a generator is supplying the electricity, it must be located outdoors and properly grounded and vented.

3.3.9 Physical Hazard Considerations for Material Handling

There are moderate to severe risks associated with moving heavy objects at the Site. The best method of reducing back injuries is to reduce or eliminate manual lifting. Mechanical lifting devices should be used whenever possible.

- Size up the load before attempting to lift it. Heavy objects will be lifted and moved by mechanical devices rather than manual effort whenever possible. Never overexert when lifting.
    - When using a mechanical device, the devices should be appropriate for the lifting of moving tasks and operated only by trained and authorized personnel.
    - Objects that require special handling or rigging will only be moved under the

guidance of a person who has been specifically trained to move such objects.
    - Lifting devices will be inspected, certified, and labeled to confirm their weight capacities. Defective equipment will be taken out of service immediately and repaired or destroyed.
    - The wheels of any truck being loaded or unloaded will be choked to prevent movement. Outriggers will be fully extended to a flat, firm surface during operation.
    - Personnel will not pass under a raised load, nor will a suspended load be left unattended.
    - Personnel will not be carried on lifting equipment unless it is specifically designed to carry passengers.
    - All reciprocating, rotating, or other moving parts will be always guarded.
    - Accessible fire extinguishers, currently (monthly) inspected, will be available in all mechanical lifting devices.
    - Verify all loads/materials are secure before transportation
- If manual lifting cannot be avoided the following lifting procedures are recommended.
    - If the load is thought to be more than one person can handle, get another person to help with the job.
    - Make sure you can carry the load where you need to go before attempting to lift it. Make sure your path is clear of equipment, materials, debris, holes, etc.
    - Place your feet close to the object, spread about 12 inches apart.
    - Bend your knees and get a good hand hold.
    - Lift straight up smoothly, allowing your legs not your back to do the work.
    - Keep the load close to the body with your elbows and arms tucked in.
    - Do not twist or turn your body once you have made the lift.
    - Set the load down properly:
        - Lower the load slowly by bending at your knees, letting your legs do most of the work.
        - Don't let go of the load until it's secure on the surface.

Material handling tasks that are unusual or require specific guidance will need a written addendum to this HASP. The addendum must identify the lifting protocols before the tasks are performed. Upon approval, the plan must be reviewed with all affected employees and documented. Any deviation from a written plan will require approval by the Langan HSM.

3.3.10 Hearing Conservation

Under the construction industry standard, the maximum permissible occupational noise exposure is 90 A-weighted decibels (dbA) (8-hour TWA), and noise levels more than 90 dbA must be reduced through feasible administrative and engineering controls (20 CFR 1926.52). Hearing protection is required when working within 15 feet of vacuum extraction equipment and drill rigs.

3.3.11 Open Water

Employees working over or near water, where the danger of drowning exists, must be provided with U.S. Coast Guard-approved life jackets or buoyant work vests. Prior to and after each use, the buoyant work vests or life preservers must be inspected for defects that would alter their strength or buoyancy. Defective units must not be used.

And should a worker fall into the water, OSHA requires (29 CFR 1926.106(c)) that ring-buoys with at least 90 feet of the line must be provided and ready for emergency rescue operations. The distance between ring buoys must not exceed 200 feet. Another remedial action required by OSHA (29 CFR 1926.106(d)) is the use of lifesaving skiffs.

OSHA requires that at least one lifesaving skiff must be immediately available at locations where employees are working over or adjacent to water and must include the following provisions.

- The skiff must be in the water or capable of being quickly launched by one person.
- At least one person must be present and specifically designated to respond to water emergencies and always operate the skiff when there are employees above water.
- When the operator is on break another operator must be designated to provide requisite coverage when there are employees above water.
- The designated operator must either have the skiff always staffed or have someone remain in the immediate area such that the operator can quickly reach the skiff and perform rescue services.
- The skiff operator may be assigned other tasks provided the tasks do not interfere with the operator's ability to quickly reach the skiff.
- A communication system, such as a walkie-talkie, must be used to inform the skiff operator of an emergency and to inform the skiff operator where the skiff is needed.
- The skiff must be equipped with both a motor and oars.

Regarding the number of skiffs required and the appropriate maximum response time, the following factors must be evaluated:

- The number of work locations where there is a danger of falling into water.
- The distance to each of those locations.
- Water temperature and currents.
- Other hazards such as, but not limited to, rapids, dams, and water intakes.

Other regulations that present H&S practices and PPE for work on or near water include: 29 CFR 1910, Subpart T (401 – 440).

3.4 Biological Hazards

3.4.1 Animals

There is a possibility of encountering wildlife including reptiles, rodents, and other small and medium-sized mammals. Langan personnel are to avoid interacting with any wildlife.

3.4.2 Insects

Ticks and other biting or stinging insects may be encountered during site operations. Langan personnel should take necessary precautions including wearing long sleeve shirts and insecticide to prevent bites and stings. After fieldwork, Langan personnel should perform a complete visual inspection of their clothing to ensure they are not inadvertently harboring ticks. If they do observe a tick bite, they are to contact the HSM or HSO and report the event.

3.4.3 Plants

Poisonous plants may be encountered during site operations. Langan personnel should take necessary precautions including donning long sleeve shirts and applying preventative poison Ivy/Sumac lotion to prevent or limit the effects of exposure. If after fieldwork, Langan employees do observe a reaction to poisonous plant exposure, they are to contact the HSM or HSO and report the event.

3.4.4 Mold

This section is restricted to subsurface investigations where sampling soil, groundwater, soil or sub-slab vapor or ambient air in an indoor environment with slight to moderate mold impact. Mold exposure symptoms include nasal stuffiness, eye irritation, or wheezing.

The Langan field engineer is required to don a ½ face respirator with a minimum p-100 particulate filter and Tyvek™ type overclothing before entering mold impacted indoor work area. The Langan field engineer must be medically cleared and have been properly fitted for a respirator before donning one.

3.5 Additional Safety Analysis

3.5.1 Presence of Non-Aqueous Phase Liquids (NAPL)

Special care and PPE should be considered when NAPL is observed as NAPL is a typically flammable fluid and releases VOCs known to be toxic and/or carcinogenic. If NAPL is present in

a monitoring well, vapors from the well casing may contaminate the work area breathing zone with concentrations of VOCs potentially exceeding health and safety action levels. In addition, all equipment used to monitor or sample NAPL (or ground water from wells containing NAPL) must be intrinsically safe. Equipment that directly contacts NAPL must also be resistant to organic solvents.

At a minimum, a PID should be used to monitor VOCs when NAPL is observed. If NAPL is expected to be observed in an excavation or enclosed area, air monitoring must be started using calibrated air monitoring equipment designed to sound an audio alarm when atmospheric concentrations of VOC are within 10% of the LEL. In normal atmospheric oxygen concentrations, the LEL monitoring may be done with a Wheatstone bridge/catalytic bead type sensor (i.e., MultiRAE). However, in oxygen-depleted atmospheres (confined space), only an LEL designed to work in low-oxygen environments may be used. Best practices require that the LEL monitoring unit be equipped with a long sniffer tube to allow the LEL unit to remain outside the UST excavation.

When NAPL is present, Langan personnel are required to always use disposable nitrile gloves to prevent skin contact with contaminated materials. They should also consider having available respirators and protective clothing (Tyvek® overalls), especially if NAPL is in abundance and there are high concentrations of VOCs.

All contaminated disposables including PPE and sampling equipment must be properly disposed of in labeled 55-gallon drums.

3.6 Job Safety Analysis

A Job Safety Analysis (JSA) is a process to identify existing and potential hazards associated with each job or task so these hazards can be eliminated, controlled, or minimized. A JSA will be performed at the beginning of each workday, and additionally whenever an employee begins a new task or moves to a new location. All JSAs must be developed and reviewed by all parties involved. A blank JSA form and documentation of completed JSAs are in Attachment G.

4.0 PERSONNEL TRAINING

4.1 Basic Training

Completion of an initial 40-hour HAZWOPER training program as detailed in OSHA's 29 CFR 1910.120(e) is required for all employees working on a site engaged in hazardous substance removal or other activities which expose or potentially expose workers to hazardous substances, health hazards, or safety hazards as defined by 29 CFR 1910.120(a). Annual 8-hour refresher training is also required to maintain competencies to ensure a safe work environment. In addition

to these training requirements, all employees must complete the OSHA 10-hour Construction Safety and Health training, and supervisory personnel must also receive eight additional hours of specialized management training. Training records are maintained by the HSM.

4.2 Initial Site-Specific Training

Training will be provided to specifically address the activities, procedures, monitoring, and equipment for site operations at the beginning of each field mobilization and the beginning of each discrete phase of work. The training will include the site and facility layout, hazards, and emergency services at the site, and will detail all the provisions contained within this HASP. For a HAZWOPER operation, training on the site must be for a minimum of 3 days. Specific issues that will be addressed include the hazards described in Section 3.0.

4.3 Tailgate Safety Briefings

Before starting work each day or as needed, the Langan HSO will conduct a brief tailgate safety meeting to assist site personnel in conducting their activities safely. Tailgate meetings will be documented in Attachment H. Briefings will include at a minimum the following:

- Work plan for the day.
- Review of safety information relevant to planned tasks and environmental conditions.
- New activities/tasks being conducted.
- Driving conditions/hazards/designated parking areas.
- Results of Jobsite Safety Inspection Checklist.
- Changes in work practices.
- Safe work practices; and
- Discussion and remedies for noted or observed deficiencies.

5.0 MEDICAL SURVEILLANCE

All personnel who will be performing fieldwork involving potential exposure to toxic and hazardous substances (defined by 29 CFR 1910.120(a)) will be required to have passed an initial baseline medical examination, with follow-up medical exams thereafter, consistent with 29 CFR 1910.120(f). Medical evaluations will be performed by, or under the direction of, a physician certified in occupational medicine.

Additionally, personnel who may be required to perform work while wearing a respirator must receive medical clearance as required under CFR 1910.134(e), *Respiratory Protection*. Medical evaluations will be performed by, or under the direction of, a physician certified in occupational medicine. Results of medical evaluations are maintained by the HSM.

5.1 Mercury Monitoring

Langan includes medical monitoring for mercury during the initial baseline and annual physical.

5.2 Coronavirus

General Preventative Measures

Field personnel must follow general proper hygiene measures while in the field including:

- Avoid touching eyes, nose, and mouth.
- Cover your mouth when you are about to cough or sneeze with tissue and throw in the trash.
- Wash hands often with soap and water for 20 seconds after going to the bathroom, before eating, after blowing nose, coughing, or sneezing.
- Use hand sanitizer with at least 60% alcohol if soap and water are not available.
- Avoid physical contact with other people (e.g., no handshakes).
- Maintain a safe distance of at least six feet from other people (social distancing).
- Wear face coverings when around other workers to minimize the spread of COVID-19. (May be required in certain states or locations.)

Construction Trailers

Employees should avoid the use of shared construction trailers or where employees cannot maintain a safe distance (minimum 6 feet) from other workers. If trailer use is needed, areas such as desks, phones, chairs, and other common areas, should be cleaned and disinfected before and after use. Protocols should be developed to minimize trailer use to essential personnel, restrict use from any workers who are ill or showing symptoms of being ill, use face coverings and ensure a safe distance of six feet can be established between workers.

Communication

Include Coronavirus topics and prevention topics in daily tailgate meetings to ensure Coronavirus awareness is communicated daily. Discussions can focus on general topics including social distancing, prevention measures for field personnel, signs and symptoms, and recent news on the Coronavirus. Site-specific topics should include minimizing face-to-face contact, disinfecting/sterilizing field equipment, use of PPE to reduce exposure, site security, use of face coverings, and other potential exposure issues/concerns.

Sick/Ill Workers

No Langan employee is permitted to be onsite when ill and/or showing potential symptoms of the Coronavirus. Symptoms of the Coronavirus may appear 2-14 days after exposure and can range from mild to severe. The most common symptoms include fever, fatigue, dry cough, shortness of breath chills, repeated shaking with chills, muscle pain, headache, sore throat, or new loss of taste or smell. If an employee or subcontractor is observed being ill or exhibiting symptoms of Coronavirus, employees must immediately utilize their Stop Work Authority and contact their project manager to address the situation. If an employee observes another worker onsite exhibiting symptoms of Coronavirus, immediately utilize Stop Work Authority, notify their project manager, and site manager or safety officer. Work should resume when the safety and health of Langan and subcontractors is adequately addressed.

6.0 PERSONAL PROTECTIVE EQUIPMENT

6.1 Levels of Protection

Langan will provide PPE to Langan employees to protect them from the specific hazards they are likely to encounter onsite. Directly hired contractors will provide their employees with equivalent PPE to protect them from the specific hazards likely to be encountered on-site. Selection of the appropriate PPE must take into consideration: (1) identification of the hazards or suspected hazards; (2) potential exposure routes; and (3) the performance of the PPE construction (materials and seams) in providing a barrier to these hazards.

Human exposure to contaminants found in the subsurface can occur through three primary routes:

- Inhalation of gases, vapors, dust, or mist is a common route of exposure. Chemicals can enter and irritate the airways and the lungs. They can become deposited in the airways or can be absorbed through the lungs into the bloodstream.
- Direct contact of contaminants with the skin or eyes is a common route of exposure. Some substances are absorbed through the skin and can enter the bloodstream. Broken, cut, or cracked skin will allow substances to enter the body more easily.
- Ingestion or swallowing of food, drink, or other substances is the third route of exposure. Chemicals that get in or on food, utensils, or hands can be ingested. Substances can be absorbed into the blood.

Based on anticipated site conditions and the proposed work activities to be performed at the site, Level D protection will be used. The upgrading/downgrading of the level of protection will be

based on continuous air monitoring results as described in Section 6.0 (when applicable). The decision to modify standard PPE will be made by the site HSO or FTL after conferring with the PM. The levels of protection are described below.

Level D Protection (as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes
- Coveralls (Tyvek® or equivalent)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection
- Reflective safety vest

Level D Protection (Modified, as needed)

- Safety glasses with side shields or chemical splash goggles
- Safety boots/shoes (toe-protected)
- Disposable chemical-resistant boot covers.
- Coveralls (poly-coated Tyvek or equivalent to be worn when contact with wet contaminated soil, groundwater, or non-aqueous phase liquids is anticipated)
- Hard hat
- Long sleeve work shirt and work pants
- Nitrile gloves
- Hearing protection (as needed)
- Personal floatation device (for work within 5 ft of the water)
- Reflective traffic vest

Level C Protection (as needed)

- Full or Half face, air-purifying respirator, with NIOSH approved High-Efficiency Particulate Air (HEPA) filter.
- Inner (latex) and outer (nitrile) chemical-resistant gloves
- Safety glasses with side shields or chemical splash goggles
- Chemical-resistant safety boots/shoes
- Hard hat
- Long sleeve work shirt and work pants
- Coveralls (Tyvek® or equivalent)

- Hearing protection (as needed)
- Reflective safety vest

The action levels used in determining the necessary levels of respiratory protection and upgrading to Level C are summarized in Table 4. The written Respiratory Protection Program is maintained by HSM and is available if needed. The monitoring procedures and equipment are outlined in Section 6.0 (when applicable).

6.2 Respirator Fit-Test.

All Langan employees who may be exposed to hazardous substances at the work site must be in possession of a full or half face air-purifying respirator and have been successfully fitted within the past year. Fit-test records are maintained by the HSM.

6.3 Respirator Cartridge Change-Out Schedule

Respiratory protection is required to be worn when certain action levels (Table 2) are reached. A respirator cartridge change-out schedule has been developed to comply with 29 CFR 1910.134. The respirator cartridge change-out schedule for this project is as follows:

- Cartridges must be removed and disposed of at the end of each shift when cartridges become wet or the wearer experiences a breakthrough, whichever occurs first.
- If the humidity exceeds 85%, then cartridges must be removed and disposed of after 4 hours of use.

Respirators must not be stored at the end of the shift with contaminated cartridges left on. Cartridges must not be worn on the second day, no matter how short the time period was the previous day they were used.

7.0 AIR QUALITY MONITORING AND ACTIONS LEVELS

7.1 Monitoring During Site Operations

Atmospheric air monitoring results may be collected and used to provide data to determine when exclusion zones need to be established and when certain levels of personal protective equipment are required. For all instruments, there are Site-specific action-level criteria that are used in making field health and safety determinations. Other data, such as the visible presence of contamination or the steady state nature of air contaminant concentration, are also used in making field health and safety decisions. Therefore, the HSO may establish an exclusion zone or require a person to wear a respirator even though atmospheric air contaminant concentrations are below established HASP action levels.

During site work involving disturbance of petroleum-impacted or fill material, real-time air monitoring may be conducted for methane and VOCs. A MultiRAE LEL/Oxygen (O2) meter and FID will be used to monitor the LEL of methane, and a PID and/or FID will be used to monitor concentrations of VOCs at personnel breathing-zone height. Air monitoring will be the responsibility of the HSO or appointed substitute. Air monitoring may be conducted during intrusive activities associated with the completion of excavation, debris removal, and soil grading. All manufacturers' instructions for instrumentation and calibration will be available onsite.

Subcontractors' air monitoring plans must be equal to or more stringent than the Langan plan.

An air monitoring calibration log is provided in Attachment D of this HASP.

7.1.1 Volatile Organic Compounds

Monitoring with a PID, such as a MiniRAE 2000 (10.6v) or equivalent may occur during intrusive work in the Areas of Concern (AOCs). Colorimetric Indicator Tubes for benzene may be used as a backup for the PID if measurements remain above background monitor every 2 hours. The HSO will monitor the employee's breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (odors, visible gases, etc.) since the last measurement. If VOC levels are observed above 5 ppm for longer than 5 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for monitored gases are provided in Table 4.

7.1.2 Metals

Based upon the site historic fill, there is a potential for the soils to contain Polycyclic Aromatic Hydrocarbons (PAHs) and metals. During invasive procedures which have the potential for creating airborne dust, such as excavation of dry soils, a real-time airborne dust monitor such as a Mini-Ram may be used to monitor for air particulates. The HSO will monitor the employee's breathing zone at least every 30 minutes, or whenever there is any indication that concentrations may have changed (appearance of visible dust) since the last measurement. If dust levels are observed to be greater than 0.100 milligrams per cubic meter (mg/m^3) or visible dust is observed for longer than 15 minutes or if the site PPE is upgraded to Level C, the HSO will begin monitoring the site perimeter at a location downwind of the AOC every 30 minutes in addition to the employee breathing zone. Instrument action levels for dust monitoring are provided in Table 4.

7.1.3 Methane

During soil excavation or other intrusive activities, direct reading air monitoring may be performed in the excavation area to determine exposure to workers. Monitoring an LEL/O2 meter and FID

may occur during intrusive work in the AOCs. The HSO will monitor the employees' breathing zone at least hourly during intrusive activities. If LEL levels are observed above 20% the professional engineer (PE) or their designee will stop work and evacuate the area; warn others; and determine source of readings and take corrective actions. The Contractor will be responsible for mitigating explosive gas levels.

7.2 Monitoring Equipment Calibration and Maintenance

Instrument calibration must be documented and included in a dedicated safety and health logbook or on separate calibration pages of the field book. All instruments must be calibrated before and after each shift. Calibration checks may be used during the day to confirm instrument accuracy. Duplicate readings may be taken to confirm individual instrument responses.

All instruments must be operated in accordance with the manufacturers' specifications. Manufacturers' literature, including an operation manual for each piece of monitoring equipment, will be maintained on-site by the HSO for reference.

7.3 Determination of Background Levels

Background (BKD) levels for VOCs, dust and methane will be established prior to intrusive activities within the AOC at an upwind location. A notation of BKD levels will be referenced in the daily monitoring log. BKD levels are a function of prevailing conditions. BKD levels will be taken in an appropriate upwind location as determined by the HSO.

Table 4 lists the instrument action levels.

8.0 COMMUNITY AIR MONITORING PROGRAM

Community air monitoring may be conducted in compliance with local standards. If conducted, Langan will implement the generic CAMP outlined below amended to comply with local conditions or standards:

Monitoring for dust and odors will be conducted during all ground intrusive activities by the FTL. Continuous monitoring of the perimeter of the work zones for odor, VOCs, and dust may be required for all ground intrusive activities such as soil excavation and handling activities. The work zone is defined as the general area in which machinery is operating in support of remediation activities. A portable PID will be used to monitor the work zone and for periodic monitoring for VOCs during activities such as soil and groundwater sampling and soil excavation. The site perimeter will be monitored for fugitive dust emissions by visual observations as well as instrumentation measurements (if required). When required, particulate or dust will be monitored continuously with real-time field instrumentation that will meet, at a minimum, the local standards

or, default to the performance standards below:

If VOC monitoring is required, the following actions will be taken based on VOC levels measured:

- If total VOC levels exceed 5 ppm above background for the 15-minute average at the perimeter, work activities will be temporarily halted and monitoring continued. If levels readily decrease (per instantaneous readings) below 5 ppm above background, work activities will resume with continued monitoring.
- If total VOC levels at the downwind perimeter of the hot zone persist at levels more than 5 ppm above background but less than 25 ppm, work activities will be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps work activities will resume provided that the total organic vapor level is 200 feet downwind of the hot zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm above background for the 15-minute average.
- If the total VOC level is above 25 ppm at the perimeter of the hot zone, activities will be shut down.

If dust monitoring with field instrumentation is required, the following actions will be taken based on instrumentation measurements:

- If the downwind particulate level is 100 micrograms per cubic meter (µg/m³) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression must be employed. Work may continue with dust suppression techniques provided that downwind particulate matter less than 10 microns (PM10) levels do not exceed 150 µg/m³ above the background level and provided that no visible dust is migrating from the work area.
- If, after implementation of dust suppression techniques, downwind PM10 levels are greater than 150 µg/m³ above the background level, work must be stopped, and a re-evaluation of activities initiated. Work can resume if dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.

8.1 Dust Suppression Techniques

Preventative measures for dust generation may include wetting site fill and soil, construction of an engineered construction entrance with a gravel pad, a truck wash area, covering soils with tarps, and limiting vehicle speeds to five miles per hour.

Work practices to minimize odors and vapors include limiting the time that the excavations remain open, minimizing stockpiling of contaminated-source soil, and minimizing the handling of contaminated material. Offending odor and organic vapor controls may include the application of foam suppressants or tarps over the odor or VOC source areas. Foam suppressants may include biodegradable foams applied over the source material for short-term control of the odor and VOCs.

If odors develop and cannot be otherwise controlled, additional means to eliminate odor nuisances will include direct load-out of soils to trucks for off-site disposal; use of chemical odorants in spray or misting systems; and use of staff to monitor odors in surrounding neighborhoods.

Where odor nuisances have developed during remedial work and cannot be corrected, or where the release of nuisance odors cannot otherwise be avoided due to on-site conditions or proximity to sensitive receptors, odor control will be achieved by sheltering excavation and handling areas under tented containment structures equipped with appropriate air venting/filtering systems.

9.0 WORK ZONES AND DECONTAMINATION

9.1 Site Control

Work zones are intended to control the potential spread of contamination throughout the site and to ensure that only authorized individuals are permitted into potentially hazardous areas. Specific zones will be established on the work site by the Contractor when operations begin for each task requiring such delineation. Maps depicting the zones will be available at the Site.

Any person working in an area where the potential for exposure to site contaminants exists will only be allowed access after providing the HSO with proper training and medical documentation.

Exclusion Zone (EZ) - All activities which may involve exposure to site contaminants, hazardous materials, and/or conditions should be considered an EZ. Decontamination of field equipment will also be conducted in the Contaminant Reduction Zone (CRZ) which will be located on the perimeter of the EZ. The EZ and the CRZ will be delineated by cones, tapes, or other means. The HSO may establish more than one EZ where different levels of protection may be employed, or different hazards exist. The size of the EZ must be determined by the HSO allowing adequate space for the activity to be completed, field members, and emergency equipment.

9.2 Contamination Zone

9.2.1 Personnel Decontamination Station

Personal hygiene, coupled with diligent decontamination, will significantly reduce the potential for exposure.

9.2.2 Minimization of Contact with Contaminants

During the completion of all site activities, personnel should attempt to minimize the chance of contact with contaminated materials. This involves a conscientious effort to keep "clean" during site activities. All personnel should minimize kneeling, splash generation, and another physical contact with contamination as PPE is intended to minimize accidental contact. This may minimize the degree of decontamination required and the generation of waste materials from site operations.

Field procedures will be developed to control spray and runoff and to ensure that unprotected personnel working nearby are not affected.

9.2.3 Personnel Decontamination Sequence

Decontamination may be performed by removing all PPE used in EZ and placing it in drums/trash cans at the CRZ. Baby wipes should be available for wiping hands and face. Drums/trash cans will be labeled by the field crews in accordance with all local, state, and federal requirements. Management plans for contaminated PPE, and tools are provided below.

9.2.4 Emergency Decontamination

If circumstances dictate that contaminated clothing cannot be readily removed, then remove gross contamination and wrap injured personnel with clean garments/blankets to avoid contaminating other personnel or transporting equipment. If the injured person can be moved, he/she will be decontaminated by site personnel as described above before emergency responders handle the victim. If the person cannot be moved because of the extent of the injury (a back or neck injury), provisions must be made to ensure that emergency response personnel will be able to respond to the victim without being exposed to potentially hazardous atmospheric conditions. If the potential for inhalation hazards exists, such as with open excavation, this area will be covered with polyethylene sheeting to eliminate any potential inhalation hazards. All emergency personnel should be immediately informed of the injured person's condition, and potential contaminants, and provided with all pertinent data.

9.2.5 Hand-Held Equipment Decontamination

Hand-held equipment includes all monitoring instruments as stated earlier, samples, hand tools, and notebooks. The hand-held equipment is dropped at the first decontamination station to be decontaminated by one of the decontamination team members. These items must be decontaminated or discarded as waste prior to removal from the CRZ.

To aid in decontamination, monitoring instruments can be sealed in plastic bags or wrapped in polyethylene. This will also protect the instruments against contaminants. The instruments will be wiped clean using wipes or paper towels if contamination is visually evident. Sampling equipment, hand tools, etc. will be cleaned with non-phosphorous soap to remove any potentially contaminated soil and rinsed with deionized water. All decontamination fluids will be containerized and stored on-site pending waste characterization sampling and appropriate off-site disposal.

9.2.6 Heavy Equipment Decontamination

All heavy equipment and vehicles arriving at the work site will be free from contamination from offsite sources. Any vehicles arriving at work that are suspected of being impacted will not be permitted on the work site. Potentially contaminated heavy equipment will not be permitted to leave the EZ unless it has been thoroughly decontaminated and visually inspected by the HSO or his appointed substitute.

9.3 Support Zone

The support zone or cold zone will include the remaining areas of the job site. Break areas and support facilities (including equipment storage and maintenance areas) will be in this zone. No equipment or personnel will be permitted to enter the cold zone from the hot zone without passing through the decontamination station in the warm zone (if necessitated). Eating, smoking, and drinking will be allowed only in this area.

9.4 Communications

The following communications equipment will be utilized as appropriate.

- Telephones - A cellular telephone will be located with the HSO for communication with HSM and emergency support services/facilities.

- Hand Signals - Hand signals must be used by field teams, along with the buddy system. The entire field team must know them before operations commence and their use covered during site-specific training. Typical hand signals are the following:

Hand Signal	Meaning
Hand gripping throat	Out of air, cannot breathe
Grip your partner's wrists or place both hands around the waist	Leave immediately without debate
Hands on top of head	Need assistance
Thumbs up	OK; I am all right; I understand
Thumbs down	No; negative
Simulated "stick" break with fists	Take a break; stop work

9.5 The Buddy System

When working in teams of two or more, workers will use the "buddy system" for all work activities to ensure that rapid assistance can be provided in the event of an emergency. This requires work groups to be organized such that workers can remain close together and maintain visual contact with one another. Workers using the "buddy system" have the following responsibilities:

- Provide his/her partner with assistance.
- Observe his/her partner for signs of chemical or heat exposure.
- Periodically check the integrity of his/her partner's PPE.
- Notify the HSO or other site personnel if emergency service is needed.

10.0 NEAREST MEDICAL ASSISTANCE

The address and telephone number of the nearest hospital:

New York-Presbyterian Allen Hospital
5141 Broadway
New York, New York
212-932-4000

A map with directions to the hospital is shown in Figure 2. This information will either be posted prominently on the site or will be available to all personnel all the time. Further, all field personnel, including HSO & FTL, will know the directions to the hospital.

11.0 STANDING ORDERS/SAFE WORK PRACTICES

The standing orders, which consist of a description of safe work practices that must always be followed while on-site by Langan employees and contractors, are shown in Attachment A. The

site HSO and FTL each have the responsibility for enforcing these practices. The standing orders will be posted prominently at the site or are always made available to all personnel. Those who do not abide by these safe work practices will be removed from the site.

12.0 SITE SECURITY

No unauthorized personnel must be permitted access to the work areas.

13.0 UNDERGROUND UTILITIES

As provided in Langan's Underground Utility Clearance Guidelines, the following safe work practices should be followed by Langan personnel and the contractor before and during subsurface work in accordance with federal, state, and local regulations:

- Obtain available utility drawings from the property owner/client or operator.
- Provide utility drawings to the project team.
- In the field, mark the proposed area of subsurface disturbance (when possible).
- Ensure that the utility clearance system has been notified.
- Ensure that utilities are marked before beginning subsurface work.
- Discuss subsurface work locations with the owner/client and contractors.
- Obtain approval from the owner/client and operators for proposed subsurface work locations.
- Use safe digging procedures when applicable.
- Stay at least ten feet from all equipment performing subsurface work.
- Ensure that the one-call (811) system or state utility hotline in your area has been notified. Private mark-outs may require the use of ground penetrating radar (GPR).
- Attempt to stay at least 15 feet from subsurface electrical lines and at least 10 feet from all other utility lines or mark-outs. Minimum clearance distances may increase as per chart below.
- Hand auger subsurface boreholes and test pits to 5 feet below ground surface.

TABLE A—MINIMUM CLEARANCE DISTANCES

Voltage (nominal, kV, alternating current)	Minimum clearance distance (feet)
up to 50	10
over 50 to 200	15
over 200 to 350	20
over 350 to 500	25
over 500 to 750	35
over 750 to 1,000	45
over 1,000	(as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution).

14.0 SITE SAFETY INSPECTION

The Langan HSO, or alternate, will check the work area daily, at the beginning and end of each work shift, or more frequently to ensure safe work conditions. The HSO or alternate must complete the Jobsite Safety Inspection Checklist, found in Attachment F. Any deficiencies must be shared with the FTL, HSM, and PM and will be discussed at the daily tailgate meeting.

15.0 HAND AND POWER TOOLS

All hand- and electric-power tools and similar equipment must be maintained in safe operating condition. All electric-power tools must be inspected before initial use. Damaged tools must be removed immediately from service or repaired. Tools must be used only for the purpose for which they were designed. All users must be properly trained in their safe operation.

16.0 EMERGENCY RESPONSE

16.1 General

This section establishes procedures and provides information for use during a project emergency. Emergencies happen unexpectedly and quickly and require an immediate response; therefore, contingency planning and advanced training of staff is essential. Specific elements of emergency support procedures that are addressed in the following subsections include communications, local emergency support units, and preparation for medical emergencies, first aid for injuries incurred on site, record keeping, and emergency site evacuation procedures. In case of emergency, in addition to 911, call *WorkCare - Incident Intervention®* at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **973-560-4699** as soon as possible.

Should outside assistance be needed for accidents, fire, or release of hazardous substances, the emergency numbers will be available and posted at the site (Table 5) where a readily accessible telephone is made available for emergency use.

Also, in the event of an incident where a team member becomes exposed or suffers from an acute symptom from contact with site materials and must be taken to a hospital, a short medical data sheet (Attachment C) for that individual will be made available to the attending physician. The medical data sheet will include the following:

- Name, address, home phone
- Age, height, weight
- Name of person to be notified in case of an accident.
- Allergies

- Sensitivities
- Does he/she wear contact lenses?
- Short checklist of previous illness
- Name of personal physician and phone
- Name of company physician and phone
- Prescription and non-prescription medications currently used.

An incident reporting form is included in Attachment C.

16.2 Responsibilities

16.2.1 Health and Safety Officer (HSO)

The HSO is responsible for ensuring that all personnel are evacuated safely, and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. The HSO is responsible for ensuring the HSM is notified of all incidents, all injuries, near-misses, fires, spills, releases, or equipment damage. The HSO is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized) so that the HSM can notify OSHA within the required time limit.

16.2.2 Emergency Coordinator

The HSO or their designated alternate will serve as the Emergency Coordinator. The Emergency Coordinator is responsible for ensuring that all personnel are evacuated safely, and that machinery and processes are shut down or stabilized in the event of a stop work order or evacuation. They are also responsible for ensuring HSM is notified of all incidents, all injuries, near misses, fires, spills, releases, or equipment damage. The Emergency Coordinator is required to immediately notify the HSM of any fatalities or catastrophes (three or more workers injured and hospitalized.

The Emergency Coordinator must locate emergency phone numbers and identify hospital routes prior to beginning work on the sites. The Emergency Coordinator must make necessary arrangements to be prepared for any emergencies that could occur.

The Emergency Coordinator is responsible for implementing the Emergency Response Plan.

16.2.3 Site Personnel

Project site personnel are responsible for knowing the Emergency Response Plan and the procedures contained herein. All personnel are expected to notify the Emergency Coordinator of

situations that could constitute a site emergency. Project site personnel, including all subcontractors, will be trained in the Emergency Response Plan.

16.3 Communications

Once an emergency has been stabilized, the injured Langan personnel should contact *WorkCare - Incident Intervention®* at 1-888-479-7787 to report their injuries. For all other communications, contact the Langan Incident Hotline at **973-560-4699** as soon as possible.

16.4 Local Emergency Support Units

To be able to deal with any emergency that might occur during investigative activities at the site, the Emergency Notification Numbers (Table 5) will be posted and provided to all personnel conducting work within the EZ.

Figure 2 shows the hospital route map. Outside emergency number 911 and local ambulances should be relied on for response to medical emergencies and transport to emergency rooms. Always contact first responders when there are serious or life-threatening emergencies on the site. Project personnel are instructed not to drive injured personnel to the Hospital. In the event of an injury, provide first aid and keep the injured party calm and protected from the elements, and treat for shock when necessary.

16.5 Pre-Emergency Planning

Langan will communicate directly with administrative personnel from the emergency room at the hospital to determine whether the hospital has the facilities and personnel needed to treat cases of trauma resulting from any of the contaminants expected to be found on the site. Instructions for finding the hospital will be posted conspicuously in the site office and each site vehicle.

16.6 Emergency Medical Treatment

The procedures and rules in this HASP are designed to prevent employee injury. However, if an injury occurs, no matter how slight, it will be reported to the HSO immediately. First-aid equipment will be available on-site at the following locations:

- First Aid Kit: Contractor Vehicles
- Emergency Eye Wash: Contractor Vehicles

During the site safety briefing, project personnel will be informed of the location of the first aid station(s) that has been set up. Some injuries, such as severe cuts and lacerations or burns, may require immediate treatment. First-aid instructions provided from off-site doctors or paramedics, before an emergency-response squad arrives at the site or before the injured person can be

transported to the hospital, will be followed closely. Only in non-emergency situations may an injured person be transported to an urgent care facility. Due to hazards that may be present at the site and the conditions under which operations are conducted, an emergency may develop. Emergencies can be characterized by injury or acute chemical exposure to personnel, fire or explosion, environmental release, or hazardous weather conditions.

16.8 Emergency Site Evacuation Routes and Procedures

All project personnel will be instructed on proper emergency response procedures and locations of emergency telephone numbers during the initial site safety meeting. If an emergency occurs because of the site investigation activities, including but not limited to fire, explosion, or significant release of toxic gas into the atmosphere, the Langan Project Manager will be verbally notified immediately. All heavy equipment will be shut down, and all personnel will evacuate the work areas and assemble at the nearest intersection to be accounted for and to receive further instructions.

If an emergency arises, the FTL will implement an immediate evacuation of all project personnel due to immediate or impending danger. The FTL will also immediately communicate with the contractor to coordinate any needed evacuation of the property.

The FTL or Site Supervisor will give necessary instructions until the Designated Incident Commander (IC) assumes control. After the emergency has been resolved, the FTL or Site Supervisor will coordinate with the IC and indicate when staff should resume their normal duties. If dangers are present for those at the designated assembly point, another designated location of assembly will be established.

It will be the responsibility of the FTL or Site Supervisor to report a fire or emergency, assess the seriousness of the situation, and initiate emergency measures until the arrival of the local fire fighters or other first responders, should they be necessary. The FTL, working with emergency responders, may also order the closure of the Site for an indefinite period if it is deemed necessary.

Under no circumstances will incoming visitors be allowed to proceed to the area of concern once an emergency evacuation has been carried out. Visitors or other people present in the emergency must be instructed to evacuate the area. The FTL will ensure that access roads are not obstructed and will remain on-site to provide stand-by assistance upon the arrival of emergency personnel.

If it is necessary to temporarily control traffic in the event of an emergency, those people controlling traffic will wear proper reflection warning vests until the arrival of police or fire personnel.

16.8.1 Designated Assembly Locations

All personnel will evacuate the site and assemble at a designated assembly location. The assembly location will be designated by Langan personnel and discussed during each shift's pre-job safety briefing.

16.8.2 Accounting for Personnel

All contractors and subcontractor supervisors are responsible for the accounting of all personnel assembled at the designed assembly area. The Designated Incident Commander must be notified if personnel are not found.

16.9 Fire Prevention and Protection

In the event of a fire or explosion, procedures will include immediately evacuating the site and notification of the Langan Project Manager of the investigation activities. Portable fire extinguishers will be provided at the work zone. The extinguishers located in the various locations should also be identified prior to the start of work. No personnel will fight a fire beyond the stage where it can be put out with a portable extinguisher (incipient stage).

16.9.1 Fire Prevention

Fires will be prevented by adhering to the following precautions:

- Good housekeeping and storage of materials.
- Storage of flammable liquids and gases away from oxidizers.
- Shutting off engines to refuel.
- Grounding and bonding metal containers during transfer of flammable liquids.
- Use of UL approved flammable storage cans.
- Fire extinguishers rated at least 10 pounds ABC located on all heavy equipment, in all trailers and near all hot work activities.

The person responsible for the control of fuel source hazards and the maintenance of fire prevention and/or control equipment is the HSO.

16.10 Significant Vapor Release

Based on the proposed tasks, the potential for significant vapor release is low. However, if a release occurs, the following steps will be taken:

- Move all personnel to an upwind location. All non-essential personnel must evacuate.
- Upgrade to Level C Respiratory Protection.

- Downwind perimeter locations must be monitored for volatile organics.
- If the release poses a potential threat to human health or the environment in the community, the Emergency Coordinator must notify the Langan Project Manager.
- Local emergency response coordinators will be notified.

16.11 Overt Chemical Exposure

The following are standard procedures to treat chemical exposures. Other, specific procedures detailed on the Material Safety Data Sheet (MSDS) will be followed, when necessary.

SKIN AND EYE: Use copious amounts of soap and water from eye-wash kits and portable hand-wash stations.

CONTACT: Wash/rinse affected areas thoroughly, then provide appropriate medical attention. Skin must also be rinsed for 15 minutes if contact with caustics, acids, or hydrogen peroxide occurs. Affected items of clothing must also be removed from contact with skin.

Providing wash water and soap will be the responsibility of each individual contractor or subcontractor on-site.

16.12 Decontamination during Medical Emergencies

If emergency lifesaving first aid and/or medical treatment is required, normal decontamination procedures may need to be abbreviated or omitted. The HSO or appointed substitute will accompany contaminated victims to the medical facility to advise on matters involving decontamination when necessary. The outer garments can be removed if they do not cause delays, interfere with treatment, or aggravate the problem. Respiratory equipment must always be removed. Protective clothing can be cut away. If the outer contaminated garments cannot be safely removed on site, a plastic barrier placed between the injured individual and clean surfaces should be used to help prevent contamination of the inside of ambulances and/or medical personnel. Outer garments may then be removed at the medical facility. No attempt will be made to wash or rinse the victim if his/her injuries are life threatening unless it is known that the individual has been contaminated with extremely toxic or corrosive material which could also cause severe injury or loss of life to emergency response personnel. For minor medical problems or injuries, normal decontamination procedures will be followed.

16.13 Adverse Weather Conditions

In the event of adverse weather conditions, the HSO will determine if work continues without potentially risking the safety of all field workers. Some of the items to be considered prior to determining if work should continue are:

- Potential for heat stress and heat-related injuries.
- Potential for cold stress and cold-related injuries.
- Treacherous weather-related working conditions (hail, rain, snow, ice, high winds).
- Limited visibility (fog).
- Potential for electrical storms.
- Earthquakes.
- Other major incidents.

Site activities will be limited to daylight hours, or when suitable artificial light is provided, and acceptable weather conditions prevail. The HSO will determine the need to cease field operations or observe daily weather reports and evacuate, if necessary, in case of severe inclement weather conditions.

16.14 Spill Control and Response

All small spills/environmental releases must be contained as close to the source as possible. Whenever possible, the SDS will be consulted to assist in determining proper waste characterization and the best means of containment and cleanup. For small spills, sorbent materials such as sand, sawdust, or commercial sorbents should be placed directly on the substance to contain the spill and aid recovery. Any acid spills should be diluted or neutralized carefully prior to attempting recovery. Berms of earthen or sorbent materials can be used to contain the leading edge of the spills. All spill containment materials will be properly disposed of. An exclusion zone of 50 to 100 feet around the spill area should be established depending on the size of the spill.

All contractor vehicles must have spill kits on them with enough material to contain and absorb the worst-case spill from that vehicle. All vehicles and equipment must be inspected prior to being admitted on-site. Any vehicle or piece of equipment that develops a leak will be taken out of service and removed from the job site.

The following seven steps must be taken by the Emergency Coordinator:

1. Determine nature, identity, and amounts of major spills.
2. Make sure all unnecessary people are removed from the spill area.
3. Notify the HSO immediately.
4. Use proper PPE in consultation with the HSO.
5. If a flammable liquid, gas, or vapor is involved, remove all ignition sources, and use non-sparking and/or explosion-proof equipment to contain or clean up the spill (diesel-only vehicles, air-operated pumps, etc.)
6. If possible, try to stop the leak with the appropriate material.

7. Remove all surrounding materials that can react or compound with the spill.

In addition to the spill control and response procedures described in this HASP, Langan personnel will coordinate with the designated project manager relative to spill response and control actions. Notification to the Project Manager must be immediate and, to the extent possible, include the following information:

- Time and location of the spill.
- Type and nature of the material spilled.
- Amount spilled.
- Whether the spill has affected or has a potential to affect a waterway or sewer.
- A brief description of affected areas/equipment.
- Whether the spill has been contained.
- Expected time of cleanup completion. If spill cleanup cannot be handled by Langan's on-site personnel alone, such fact must be conveyed to the Project Manager immediately.

Langan field personnel must notify the project manager when they observe a spill or encounter conditions suggesting one might have occurred.

16.15 Emergency Equipment

The following minimum emergency equipment must be kept and maintained on site:

- Industrial first aid kit.
- Fire extinguishers (one per site).

16.16 Restoration and Salvage

After an emergency, prompt restoration of utilities, fire protection equipment, medical supplies, and other equipment will reduce the possibility of further losses. Some of the items that may need to be addressed are:

- Refilling fire extinguishers.
- Refilling medical supplies.
- Recharging eyewashes and/or showers.
- Replenishing spill control supplies.

16.17 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan Incident/Injury Hotline at 1-(800)-9-

LANGAN (extension 4699) and the client representative to report the incident or near miss. For emergencies involving personnel injury and/or exposure, the HSO and affected employee will complete and submit an Employee Exposure/Injury Incident Report (Attachment C) to the Langan Corporate Construction Health and Safety Manager as soon as possible following the incident.

17.0 SPECIAL CONDITIONS

This guideline contains information and requirements for special conditions that may not be routinely encountered.

17.1 Scope

The guideline applies to the specific projects identified within this document. Additional provisions will be addressed in each Site-Specific Construction Health and Safety Plan (HASP), as needed.

17.2 Responsibilities

Site Personnel - All site personnel must be alert to safety hazards on work sites and take action to minimize such hazards. Personnel must utilize the buddy system, watch for inappropriate behavior, and be alerted to changes in site conditions.

Construction Health and Safety Officer (HSO) - The HSO is responsible for considering these procedures in the development of site-specific HASPs. The HSO must schedule frequent "tail gate" safety briefings to enhance safety awareness and discuss potential problems.

17.3 Procedures

The procedures outlined below must be followed when such conditions are encountered.

17.3.1 Ladders

Langan safety procedures must be used to ensure employee safety when using ladders in the office or work sites. All ladders must be coated or repaired to prevent injury to the employee from punctures or lacerations and to prevent snagging or clothing. Any wood ladder used must have an opaque cover except for identification or warning labels, which may be placed on one face only of a side rail.

17.3.1.1 Ladder Use

Employees must only use ladders for the purposes they were designed for and must not be used as scaffolding. Ladders will be maintained and inspected prior to use for slip hazards including

oil and grease. Employees must use ladders only on stable and level surfaces unless the ladder is secured to prevent displacement. Ladders should not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement. Ladders should not be used in locations where they could be displaced by workplace activities or traffic. Ladder rungs, cleats and steps must be parallel, level and uniformly spaced when the ladder is in the use position.

Employees should not be carrying anything, including equipment that could cause injury if there was a fall while utilizing the ladder. The top and bottom of the ladder area must remain clear while in use. When ascending and descending the ladder, employees must face the ladder.

Ladders must not be loaded beyond the maximum intended load for which they were built or the manufacturer's rated capacity.

17.3.1.2 Portable Ladders

Rungs, cleats, and steps for portable ladders and fixed ladders must be spaced not less than 10 inches apart, nor more than 14 inches apart, as measured between center lines of the rungs, cleats, and steps. When used to access an upper landing surface, the ladder side rails must extend at least three feet above the upper landing surface to which the ladder is used to gain access. If this is not possible, due to the length of the ladder, then the top of the ladder must be secured at its top to a rigid support.

17.3.1.3 Step Stools

Rungs, cleats, and steps of step stools must not be less than 8 inches apart, nor more than 12 inches apart, as measured between center lines of the rungs, cleats, and steps.

17.3.1.4 Extension Ladders

Rungs, cleats, and steps of the base section of extension trestle ladders must be spaced not less than 8 inches apart, nor more than 18 inches apart, as measured between center lines of the rungs, cleats, and steps. The rung spacing on the extension section of the extension trestle ladder must not be less than 6 inches nor more than 12 inches, as measured between the center lines of the rungs, cleats and steps. Ladders must be used at an angle such that the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder (the distance along the ladder between the foot and the top support).

17.3.1.5 Inspection

Ladders will be inspected for visible detects periodically, prior to utilization or after any occurrence that could have negatively affected the ladder. Portable ladders with defects including broken or missing rungs, cleats, or steps, broken or split rails, corroded components, or other faulty components must not be used. The ladder will be immediately marked as defective, tagged as "Do Not Use" or blocked from being used and removed from service until repaired.

17.3.2 First Aid/Cardiopulmonary Resuscitation (CPR)

Langan field and office personnel will be encouraged to be trained in First Aid and Cardiopulmonary Resuscitation (CPR). Training will be provided free of charge by Langan to all employees. Employees will receive a training certificate that will be kept with the Health & Safety Coordinator (HSC). Training and certification will be provided by a credited provider such as American Red Cross or equivalent.

17.3.2.1 Emergency Procedures

Prior to site work, the Langan employees certified in first aid and CPR will be identified in the site-specific HASP. Langan will endear having at least one employee at a job site trained and able to render first aid and CPR. The site-specific HASP will contain first aid information on both potential chemical and physical hazards. Emergency procedures to be followed in case of injury or illnesses are provided in HASP. The HASP will include emergency contact information including local police and fire departments, hospital emergency rooms, ambulance services, on-site medical personnel, and physicians. The HASP will also include directions and contact information for the nearest emergency facility in case immediate medical attention is required. The emergency contact information will be conspicuously posted at the worksite. Employees that are injured and require immediate medical attention must call either 911 or the local posted emergency contacts. Employees should use ambulatory services to transport injured workers to the nearest facility for emergency medical care. In areas where 911 is not available, the telephone numbers of physicians, hospitals, or ambulances must be conspicuously posted.

17.3.2.2 First Aid Supplies

First aid supplies are readily available to all Langan employees when required. First aid kits are in each Langan office. Portable first aid kits are available for employees to use at work sites. First aid kits should consist of items needed to treat employees for potential chemical and physical injuries. At a minimum, first aid kits should contain items to allow basic first aid to be rendered. Where the eyes or body of an employee may be exposed to corrosive materials,

suitable facilities for quick drenching or flushing of the eyes and body must be provided within the work area for immediate emergency use including eye wash solution.

First aid kits will be weatherproof with individually sealed packages of each item. All portable first aid kits must be inspected by Langan employees before and after use to ensure all used items are replaced. When out in the field, employees must check first aid kits weekly to ensure used items are replaced.

17.3.3 Hydrogen Sulfide

Langan employees with the potential to be exposed to hydrogen sulfide while at work sites must have training in hydrogen sulfide awareness. The training will include the identification of areas where employees could be exposed to hydrogen sulfide, health effects, permissible exposure limits, first aid procedures, and personnel protective equipment. Langan employees could be exposed to hydrogen sulfide while at job sites including petroleum refineries, hazardous waste treatment, storage and disposal facilities, uncontrolled hazardous waste sites, and remediation projects.

17.3.3.1 Characteristics

Hydrogen sulfide is a colorless gas with a strong odor of rotten eggs that is soluble in water. Hydrogen sulfide is used to test and make other chemicals. It is also found as a by-product of chemical reactions, such as in sewer treatment. It is a highly flammable gas and a dangerous fire hazard. Poisonous gases are produced in fires including sulfur oxides. Hydrogen sulfide is not listed as a carcinogen.

17.3.3.2 Health Effects

Hydrogen Sulfide can affect employees if inhaled or through contact with skin or eyes. Acute (or short-term) health effects of hydrogen sulfide exposure include irritation of the nose and throat, dizziness, confusion, headache, and trouble sleeping. Inhalation of hydrogen sulfide can irritate the lungs causing coughing and/or shortness of breath. Higher levels of exposure can cause a build-up of fluids in the lungs (pulmonary edema), a medical emergency, with severe shortness of breath.

Chronic (or long-term) health effects of low levels of exposure to hydrogen sulfide can cause pain and redness of the eyes with blurred vision. Repeated exposure may cause bronchitis with cough, phlegm, and shortness of breath.

17.3.3.3 Protective Clothing and Equipment

Respirators are required for those operations in which employees will be exposed to hydrogen sulfide above OSHA permissible exposure level. The maximum OSHA permissible exposure limit (PEL) for hydrogen sulfide is 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm) for an 8-hour workday, and the maximum short-term exposure limit (STEL) is 10 ppm for any 10-minute period.

Where employees are exposed to levels up to 100 parts of hydrogen sulfide vapor per million parts of air (100 ppm), the following types of respiratory protection are allowed:

- Any powered, air-purifying respirator with cartridge(s).
- Any air-purifying, full-facepiece respirator (gas mask) with a chin style, front- or back-mounted canister.
- Any supplied air system with escape self-contained breathing apparatus, if applicable; and,
- Any self-contained breathing apparatus with a full facepiece.

Respirators used by employees must have Mine Safety and Health Administration and the National Institute for Occupational Safety and Health (NIOSH) with approval. Cartridges or canisters must be replaced before the end of their service life, or the end of the shift, whichever occurs first. Langan employees that have the potential to be exposed to hydrogen sulfide will be trained in the proper use of respirators. Respirator training is discussed under– Langan's Respiratory Protection Program.

Employees with potential exposure to hydrogen sulfide, or when required by the client, will wear a portable hydrogen sulfide gas detector. The detector should have an audible, visual, and vibrating alarm. The detector may also provide detection for carbon monoxide, sulfur dioxide, and oxygen-deficient atmospheres. The hydrogen sulfide monitor will, at a minimum, be calibrated to detect hydrogen sulfide at a level of 20 parts of hydrogen sulfide vapor per million parts of air (20 ppm). Many portable gas detectors will have factory settings with a low-level alarm at 10 ppm and a high-level alarm at 15 ppm. Langan employees must consult clients to determine if any site-specific threshold levels exist.

If the hydrogen sulfide gas detector sounds and employees are not wearing appropriate respiratory protection, employees must immediately vacate the area and meet at the assigned emergency location. Langan employees may not re- enter the site without proper respiratory protection and approval from the client or property owner if needed.

Employees must wear PPE to prevent eye and skin contact with hydrogen sulfide. Employees must wear appropriate protective clothing including boots, gloves, sleeves, and aprons, over any

parts of their body that could be exposed to hydrogen sulfide. Non-vented, impact-resistant goggles should be worn when working with or exposed to hydrogen sulfide.

17.3.3.4 Emergency and First Aid Procedures

Eye and Face Exposure

If hydrogen sulfide encounters eyes, it should be washed out immediately with large amounts of water for 30 minutes, occasionally lifting the lower and upper eye lids. Seek medical attention immediately.

Skin Exposure

If hydrogen sulfide contaminates clothing or skin, remove the contaminated clothing immediately and wash the exposed skin with large amounts of water and soap. Seek medical attention immediately. Contaminated clothing should either be disposed of or washed before wearing again.

Breathing

If a Langan employee or other personnel breathe in hydrogen sulfide, immediately get the person exposed to fresh air. If breathing has stopped, artificial respiration should be started. Call for medical assistance or a doctor as soon as possible.

Safety Precautions

Hydrogen sulfide is a highly flammable gas and a dangerous fire hazard. Containers of hydrogen sulfide may explode in a fire situation. Poisonous gases are produced during fires.

Langan employees should contact property owners and operators prior to conducting work onsite to be aware of any site-specific contingency plans, identify where hydrogen sulfide is used at the facility, and be informed about additional safety rules or procedures.

17.3.4 Fire Protection/Extinguishers

Langan field personnel that have been provided with portable fire extinguishers for use at worksites will be trained to familiarize employees with general principles of fire extinguisher use and hazards associated with the incipient stage of firefighting. Training will be provided prior to the initial assignment for field work and annually thereafter.

Portable fire extinguishers must be visually inspected monthly and subjected to an annual maintenance check. Langan will retain records of the annual maintenance date.

17.3.5 Overhead lines

When field work is performed near overhead lines, the lines must be de-energized and grounded, or other protective measures must be provided before the work commences. If overhead lines are to be de-energized, arrangements must be made with the client, property owner, or organization that operates or controls the electric circuits involved to de-energize and ground them. If protective measures, such as guarding, isolating, or insulating, are provided, these precautions must prevent employees from contacting such lines directly with any part of their body or indirectly through conductive materials, tools, or equipment.

When unqualified Langan personnel are working in an elevated position near overhead lines, the location must be such that the person and the longest conductive object they may contact cannot come closer to any unguarded, energized overhead line than the following distances:

1. For voltages to ground 50 kilovolts (kV) or below - 10 feet; and
2. For voltages to ground over 50kV - 10 feet, plus 4 inches for every 10kV over 50kV.

As previously indicated, Langan does not retain qualified employees to perform work on energized equipment.

17.3.5.1 Vehicle and Equipment Clearance

Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines must be operated so that a clearance of 10 feet is maintained. If the voltage of the overhead lines is higher than 50kV, the clearance must be increased by 4 inches for every 10kV over that voltage.

If any of the following conditions discussed occur, the clearance may be reduced.

- If the vehicle is in transit with its structure lowered, the clearance may be reduced to 4 ft. If the voltage is higher than 50kV, the clearance must be increased to 4 inches for every 10 kV over that voltage.
- If insulating barriers are installed to prevent contact with the lines, and if the barriers are rated for the voltage of the line being guarded and are not a part of or an attachment to the vehicle or its raised structure, the clearance may be reduced to a distance within the designed working dimensions of the insulating barrier.

Employees standing on the ground may not contact the vehicle or mechanical equipment or any of its attachments unless the employee is using protective equipment rated for the voltage, or the equipment is located so that no uninsulated part of its structure (that portion of the structure

that provides a conductive path to employees on the ground) can come closer to the overhead line than permitted.

If any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines is intentionally grounded, employees working on the ground near the point of grounding may not stand at the grounding location whenever there is a possibility of overhead line contact. Additional precautions, such as the use of barricades or insulation, must be taken to protect employees from hazardous ground potential, depending on earth resistivity and fault currents, which can develop within the first few feet or more outward from the grounding point.

17.3.6 Trade Secret

Langan employees could potentially be provided with secret trade information by the client or property owner when site-specific information is provided about highly hazardous chemicals. Trade secret means any confidential formula, pattern, process, device, information, or compilation of information that is used in an employer's business, and that allows the employer to obtain an advantage over competitors who do not know or use it. Langan employees understand that this information should be kept confident and if required, may enter into a confidentiality agreement with the client.

17.3.7 Bloodborne Pathogens

Langan employees that can anticipate exposure to blood or other potentially infectious material while at work sites must have training in bloodborne pathogens. Applicable employees would include those trained in first aid and serving a designated role as an emergency medical care provider. Bloodborne pathogens are pathogenic microorganisms that are present in human blood and can cause disease in humans. These pathogens include but are not limited to hepatitis B virus and human immunodeficiency virus.

17.3.7.1 Training

Langan employees with potential occupational exposure to blood or other potentially infectious material must participate in a training program. Training must be conducted prior to the initial assignment where there would be potential for exposure and annually thereafter within one year of previous training. The training program will be provided to Langan employees at no cost to them and during working hours.

Langan will ensure the training program must consist of the following:

- An accessible copy of the regulatory text of 29 CFR 1910.1030 and an explanation of its

contents.

- A general explanation of the epidemiology and symptoms of bloodborne diseases.
- An explanation of the modes of transmission of bloodborne pathogens.
- An explanation of Langan's exposure control plan and how the employee can obtain a copy of the written plan.
- An explanation of the appropriate methods for recognizing tasks and other activities that may involve exposure to blood and other potentially infectious materials.
- An explanation of the use and limitations of personal protective equipment (PPE) to prevent and reduce exposure.
- Information on the types, proper use, location, removal, handling, and disposal of PPE.
- An explanation of the basis for the selection of PPE.
- Information on the hepatitis B vaccine, including information on its efficacy, safety, method of administration, the benefits of being vaccinated, and that the vaccine and vaccination will be offered free of charge.
- Information on the appropriate actions to take and people to contact in an emergency involving blood or other potentially infectious materials.
- An explanation of the procedure to follow if an exposure incident occurs, including the method of reporting the incident and the medical follow-up that will be made available.
- Information on the post-exposure evaluation and determining whether the employer is required to provide for the employee following an exposure incident.
- An explanation of the signs and labels and/or color coding required by paragraph 29 CFR 1910.1030(g)(1); and
- An opportunity for interactive questions and answers with the person conducting the training session.

Langan will develop and implement a written Exposure Control Plan, which will be designed to eliminate or minimize employee exposure to bloodborne pathogens. The Exposure Control Plan will contain the following elements:

- An exposure determination for employees.
- The schedule and method of implementation for Methods of Compliance (29 CFR 191.1030(d)), Hepatitis B Vaccination and Post-Exposure Evaluation and Follow-up (29 CFR 1910.1030(f)), Communication of Hazards to Employees (29 CFR 1910.1030(g)) and (h) Recordkeeping (29 CFR 1910.1030(h)).
- The procedure for the evaluation of circumstances surrounding exposure incidents.
- Ensure a copy of the Exposure Control Plan will be accessible to employees; and,
- The Exposure Control Plan must be reviewed and updated at least annually.

Langan employees with occupational exposure to bloodborne pathogens include any employees trained in first aid that would be expected to provide emergency medical care. This determination is made without regard to the use of PPE, which could eliminate or minimize exposure.

Universal precautions must be observed to prevent contact with blood or other potentially infectious materials. According to the concept of Universal Precautions, all human blood and certain human body fluids are treated as if known to be infectious for bloodborne pathogens. When differentiation between body fluid types is difficult or impossible, all body fluids must be considered potentially infectious materials.

Work practice controls must be used to eliminate or minimize employee exposure, if applicable. Since Langan employees will have occupational exposure only during the rendering of first aid, personnel protective equipment will be utilized to reduce or minimize exposure. PPE that could be available to Langan personnel when administering first aid includes safety glasses, gloves, and Tyvek suits or sleeves. PPE and first aid kits will be provided to employees at no cost to them.

Langan employees that render first aid in office areas will have access to hand-washing facilities or restrooms. For first aid rendered at field locations, first aid kits will contain an appropriate antiseptic hand cleanser and clean cloth/paper towels or antiseptic towelettes. After using antiseptic hand cleansers or towelettes, employees must wash their hands with soap and running water as soon as feasible.

After administering first aid, potentially infectious materials, including towels, personnel protective equipment, clothes, and bandages, must be placed in a container, which prevents leakage during collection, handling, processing, storage, transport, or shipping. All PPE will be disposed of after use. Any equipment or working surfaces which were exposed to blood or potentially infectious materials due to an injury will be decontaminated prior to reuse.

Langan will make available the hepatitis B vaccine and vaccination series to all employees who have occupational exposure, and post-exposure evaluation and follow-up to all employees who have had an exposure incident. These services will be available to the employee at no cost to them through a medical provider.

17.3.7.2 Recordkeeping

Langan will maintain training and medical records for each employee with occupational exposure to blood or potentially infectious materials. Medical and training records will be maintained by Langan's H&S Department.

Training records will include the following:

- Dates of the training sessions.
- Contents or a summary of the training sessions.
- Names and qualifications of people conducting the training; and
- Names and job titles of all people attending the training sessions.

Training records must be maintained for 3 years from the date on which the training occurred. Medical records will be preserved and maintained for the duration of employment plus 30 years.

All records will be made available upon request to employees, the Assistant Secretary of Labor for Occupational Safety and Health, and the Director of the National Institute for Occupational Safety and Health Director of OSHA for examination and copying. Medical records must have written consent from the employee before releasing.

If Langan ceases to do business, all records must be transferred to the successor employer. The successor employer must receive and maintain these records.

If there is no successor, Langan will notify current employees of their rights to access records at least three months prior to the cessation of business.

18.0 RECORDKEEPING

The following is a summary of required health and safety logs, reports, and recordkeeping.

18.1 Field Change Authorization Request

Any changes to the work to be performed that are not included in the HASP will require an addendum that is approved by the Langan project manager and Langan HSM to be prepared. Approved changes will be reviewed with all field personnel at a safety briefing.

18.2 Medical and Training Records

Copies or verification of training (40-hour, 8-hour, supervisor, site-specific training, documentation of three-day on-the-job training (OJT), and respirator fit-test records) and medical clearance for site work and respirator use will be maintained in the office and available upon request. Records for all subcontractor employees must also be available upon request. All employee medical records will be maintained by HSM.

18.3 Onsite Log

A log of personnel on-site each day will be kept by the HSO or appointed substitute.

18.4 Daily Safety Meetings ("Tailgate Talks")

Completed safety briefing forms (Attachment H) will be maintained by the HSO or FTL.

18.5 Exposure Records

All personal monitoring results, laboratory reports, calculations, and air sampling data sheets are part of an employee exposure record. These records will be maintained by the HSO during site work. At the end of the project, they will be maintained according to 29 CFR 1910.1020.

18.6 Hazard Communication Program - SDS

Safety Data Sheets (SDS) have been obtained for applicable substances and are included in this HASP (Attachment D). Langan's written hazard communication program, in compliance with 29 CFR 1910.1200, is maintained by the HSM.

18.7 Documentation

Immediately following an incident or near miss, unless emergency medical treatment is required, either the employee or a coworker must contact the Langan incident/injury hotline at 973-560-4699, and the Project Manager to report the incident or near miss. The Project Manager will contact the client or client representative. A written report must be completed and submitted HSM within 24 hours of the incident. For emergencies involving personnel injury and/or exposure, the employee will complete and submit the Langan incident/injury report to the Langan corporate health and safety manager as soon as possible following the incident. Accidents will be investigated in-depth to identify all causes and to recommend hazard control measures.

18.7.1 Accident and Injury Report Forms

18.7.1.1 Accident/Incident Report

All injuries, no matter how slight, must be reported to the FTL and the PM immediately. The accident/incident report forms, attached to Attachment C, will be filled out on all accidents by the applicable contractor supervision personnel, the FTL, or the HSO. Copies of all accident/incident reports must be kept on-site and available for review. Project personnel will be instructed on the location of the first aid station, hospital, and doctor and ambulance service near the job. The emergency telephone numbers will be conspicuously posted in site vehicles near the work zone. First aid supplies will be centrally located and conspicuously posted between restricted and nonrestricted areas to be readily accessible to all on the site.

18.7.1.2 First Aid Treatment Record

The forms will be used for recording all non-lost time injuries treated by the project first-aid attendant, the local physician or hospital will be entered in detail on this record. "Minor" treatment of scratches, cuts, etc. will receive the same recording attention as treatment of more severe injuries.

18.7.1.3 OSHA Form 300

An OSHA Form 300 will be kept at the Langan Corporate Office in Parsippany, New Jersey. All recordable injuries or illnesses will be recorded on this form. Subcontractor employers must also meet the requirements of maintaining an OSHA 300 form. The Incident Report form used to capture the details of work-related injuries/illnesses meets the requirements of the OSHA Form 301 (supplemental record) and must be maintained with the OSHA Form 300 for all recordable injuries or illnesses. Forms for recording OSHA work-related injuries and illnesses are included in Attachment C.

19.0 CONFINED SPACE ENTRY

Confined spaces are not anticipated at the Site during planned activities. If confined spaces are identified, the contractor must implement their own confined space program that are applicable to federal, state, and local regulations. Confined spaces **will not** be entered by Langan personnel.

20.0 HASP ACKNOWLEDGEMENT FORM

All Langan personnel and contractors will sign this HASP Compliance Agreement indicating that they have become familiar with this HASP and that they understand it and agree to abide by it.

Printed Name	Signature	Company	Date

TABLES

TABLE 1
TASK HAZARD ANALYSES

Task	Hazard	Description	Control Measures	First Aid
1.3.1 – 1.3.15	Contaminated Soil or Groundwater- Dermal Contact	Contaminated water spills on skin, splashes in eyes; contact with contaminated soil/fill during activities or sampling.	Wear proper PPE; follow safe practices, maintain safe distance from activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.15	Lacerations, abrasions, punctures	Cutting bailer twine, pump tubing, acetate liners, etc. with knife; cuts from sharp site objects or previously cut piles, tanks, etc.; Using tools in tight spaces	Wear proper PPE; follow safe practices	Clean wound, apply pressure and/or bandages; seek medical attention as required.
1.3.1 – 1.3.15	Contaminated Media Inhalation	Opening drums, tanks, wells; vapors for non-aqueous phase liquids or other contaminated site media; dust inhalation during excavation; vapor accumulation in excavation	Follow air monitoring plan; have quick access to respirator, do not move or open unlabeled drums found at the site, maintain safe distance from activities	See Table 2, seek medical attention as required
1.3.1 – 1.3.15	Lifting	Improper lifting/carrying of equipment and materials causing strains	Follow safe lifting techniques. Langan employees are not to carry contractor equipment or materials	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.15	Slips, trips, and falls	Slips, trips, and falls due to uneven surfaces, cords, steep slopes, debris, and equipment in work areas	Good housekeeping at site; constant awareness and focus on the task; avoid climbing on stockpiles; maintain safe distance from activities and excavations; avoid elevated areas over six feet unless fully accredited in fall protection and wearing an approved fall protection safety apparatus	Rest, ice, compression, elevation; seek medical attention as required
1.3.1 – 1.3.15	Noise	Excavation equipment, hand tools, drilling equipment.	Wear hearing protection; maintain safe distance from activities	Seek medical attention as required
1.3.1 – 1.3.15	Falling objects	Soil material, tools, etc. dropping from drill rigs, front-end loaders, etc.	Hard hats to be worn at all times while in work zones; maintain safe distance from activities and excavations	Seek medical attention as required
1.3.1 – 1.3.15	Underground/ overhead utilities	Excavation equipment, drill rig auger contacts underground object; boom touches overhead utility	"One Call" before dig; follow safe practices; confirm utility locations with contractor; wear proper PPE; maintain safe distance from activities and excavations	Seek medical attention as required
1.3.1 – 1.3.15	Insects (bees, wasps, hornet, mosquitoes, and spider)	Sings, bites	Insect Repellent; wear proper protective clothing (work boots, socks, and light-colored pants); field personnel who may have insect allergies (e.g., bee sting) should provide this information to the HSO or FSO prior to commencing work and will have allergy medication on site.	Seek medical attention as required
1.3.1 – 1.3.15	Vehicle traffic / Heavy Equipment Operation	Vehicles unable to see workers on site, operation of heavy equipment in tight spaces, equipment failure, malfunctioning alarms	Wear proper PPE, especially visibility vest; use a buddy system to look for traffic; rope off area of work with cones and caution tape or devices at points of hazard, maintain safe distance from activities and equipment	Seek medical attention as required

TABLE 2
CONTAMINANT HAZARDS OF CONCERN

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	1,1,2-Trichloro-1,2,2-trifluoroethane Chlorofluorocarbon-113 CFC-113 Freon® 113 Genetron® 113 Halocarbon 113 Refrigerant 113 TTE Frigen 113 TR Freon TF Trichlorotrifluoroethane	76-13-1	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation skin, throat, drowsiness, dermatitis; central nervous system depression; dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite. In animals: cardiac arrhythmias, narcosis,	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	1,1-Dichloroethane Asymmetrical dichloroethane Ethylidene chloride 1,1-Ethylidene dichloride 1,1-DCA	75-34-3	PID	100 ppm 3000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the skin; central nervous system depression; liver, kidney, lung damage	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	1,2,4-Trimethylbenzene	95-63-6	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	1,2-Dichlorobenzene o-DCB	95-50-1	PID	50 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eye, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	1,2-Dichloroethane Ethylene dichloride 1,2-DCA DCE[1] Ethane dichloride Dutch liquid, Dutch oil Freon 150 Glycol dichloride	107-06-2	PID	1 ppm 50 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin absorption, skin, and/or eye contact	irritation to the eyes, corneal opacity; central nervous system depression; nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	1,3,5-Trimethylbenzene Mesitylene sym-Trimethylbenzene	108-67-8	PID	None None	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; bronchitis; hypochromic anemia; headache, drowsiness, lassitude (weakness, exhaustion), dizziness, nausea, incoordination; vomiting, confusion; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	1,3-Dichlorobenzene m-Dichlorobenzol; m-Phenylene dichloride m-dichlorobenzene m-DCB	541-73-1	PID	None None	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	1,4-Dichlorobenzene para-Dichlorobenzene p-Dichlorobenzene 1,4-Dichlorobenzene 1,4-DCB para-Dichlorobenzene p-Dichlorobenzene p-DCB PDB Paramoth Para crystals Paracide Dichlorocide	106-46-7	PID	75 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, swelling periorbital (situated around the eye); profuse rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaundice, cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	1,4-Dioxane 1,4-Dioxacyclohexane [1,4]Dioxane p-Dioxane [6]-crown-2 Diethylene dioxide Diethylene ether Dioxan Dioxane 1,4-Dioxane	123-91-1	PID	100 ppm 500 ppm	Groundwater Soil Vapor	Inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	2-Butanone Ethyl methyl ketone MEK Methyl acetone Methyl ethyl ketone	78-93-3	PID	200 ppm 3000 ppm	Soil Groundwater Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose; headache; dizziness; vomiting; dermatitis	Eye: Irrigate immediately Skin: Water wash immediately Breathing: Fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.15	2-Methylnaphthalene β-methylnaphthalene	91-57-6	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion or skin, absorption, eye contact	irritation to the skin, eyes, mucous membranes, and upper respiratory tract. It may also cause headaches, nausea, vomiting, diarrhea, anemia, jaundice, euphoria, dermatitis, visual disturbances, convulsions and comatose	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	4,4′-DDD Dichlorodiphenyldichloroethane 1,1'-(2,2-Dichloroethylidene)bis (4-chlorobenzene) p,p'-DDD	72-54-8	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	4-Isopropyltoulene 1-Methyl-4-(1-methylethyl)benzene 4-Isopropyltoluene; 4-Methylcumene; 1-Methyl-4-isopropylbenzene Dolcymene Camphogen Paracymene Cymene p-Cymene p-Isopropyltoluene	99-87-6	PID	NA NA	Soil Groundwater Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Acenaphthene 1,2-Dihydroacenaphthylene 1,8-Ethylenenaphthalene peri-Ethylenenaphthalene Naphthyleneethylene Tricyclododecapentaene	83-32-9	PID	NA NA	Soil	inhalation, ingestion, skin, and/or eye contact,	irritation to the skin, eyes, mucous membranes, and upper respiratory tract; If ingested, it can cause vomiting	Eye: Irrigate immediately Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Acenaphthylene Cycopental(de)naphthalene, Acenaphthalene	208-96-8	PID	NA NA	Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the skin, eyes, mucous membranes, and upper respiratory tract	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, if redness or irritation develop, seek medical attention immediately Breathing: Move to fresh air Swallow: do not induce vomiting, seek medical attention immediately
1.3.1 – 1.3.15	Acetone Dimethyl ketone Ketone propane 2-Propanone 3-Hexen-2-one	67-64-1	PID	1000 ppm 2500 ppm	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; headache, dizziness, central nervous system depression; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Aldrin 1,2,3,4,10,10-Hexachloro-1,4,4a,5,8,8a-hexahydro-endo-1,4-exo-5,8-dimethanonaphthalene HHDN Octalene	309-00-2	PID	0.25 ppm 5 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort); myoclonic jerks of limbs; colonic, tonic convulsions; coma; hematuria (blood in the urine), azotemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Alpha-BHC alpha-Hexachlorocyclohexane -alpha,2-alpha,3-beta,4-alpha,5-beta,6-beta-Hexachlorocyclohexane alpha-1,2,3,4,5,6-Hexachlorocyclohexane alpha-Benzenehexachloride α-1,2,3,4,5,6-hexachlorocyclohexane α-HCH α-Benzenehexachloride alpha-hexacloran(e) alpha-Lindane Alpha Hexachlorocyclohexane	319-84-6	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane possible carcinogenic, effects to liver, blood, and central nervous system	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Alpha-Chlordane Alpha Chlordane a-Chlordane	5103-71-9	None	0.5 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Aluminum	7429-90-5	None	0.5 mg/m3 50 mg/m3	Soil	inhalation, skin, and/or eye contact	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.15	Anthracene	120-12-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to the skin, eyes, mucous membranes, and upper respiratory tract, abdominal pain if ingested.	Eye: Irrigate immediately, seek medical attention immediately, Skin: Soap wash immediately, Breathing: Move to fresh air, refer to medical attention. Swallow: refer to medical attention

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Antimony	7440-36-0	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation skin, dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Aroclor 1254	11097-69-1	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Aroclor 1260	11096-82-5	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Arsenic	NA	None	0.5 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation skin, dermatitis; resp distress; diarrhea; muscle tremor, convulsions; possible gastrointestinal tract	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Barium	10022-31-8	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper respiratory system; skin, burns; gastroenteritis; muscle spasm; slow pulse	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Benzene Benzol Phenyl hydride Alkyl benzene isomers	71-43-2	PID	3.19 mg/m^3 1,595 mg/mg^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system; dizziness; headache, nausea, staggered gait; lassitude (weakness, exhaustion) [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Benzidine	92-87-5	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Benzo(a)anthracene Benzanthracene Benzanthrene 1,2-Benzanthracene Benzo[b]phenanthrene Tetraphene	56-55-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Benzo(a)pyrene	50-32-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately, seek medical attention Skin: Soap wash immediately. Breathing: move to fresh air. Swallow: Induce vomiting if conscious, seek medical attention immediately
1.3.1 – 1.3.15	Benzo(b)fluoranthene	205-99-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.15	Benzo(g,h,i)fluoranthene Benzo[ghi]fluoranthene 203-12-3 BENZO(GHI)FLUORANTHENE pentacyclo[8.8.0.02,7.03,17.013,18]octadeca-1(10),2(7),3,5,8,11,13(18),14,16-nonaene 2,13-Benzofuranthene 2,13-Benzofluoranthene	203-12-3	NA	NA NA	Soil	inhalation, skin, or eye contact, ingestion	dermatitis, bronchitis, [potential occupational carcinogen]	Eye: Irrigate immediately, seek medical attention Skin: Soap wash immediately. Breathing: move to fresh air. Swallow: Induce vomiting if conscious, seek medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Benzo(g,h,i)perylene Benzo(ghi)perylene	191-24-2	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.15	Benzo(k)fluoranthene	207-08-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.15	Benzoic acid Carboxybenzene E210 Dracylic acid Phenylmethanoic acid Benzenecarboxylic acid Benzoic acid isomer	65-85-0	None	NA NA	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to eyes with eye damage, skin, causing rash, redness or burning, irritation to nose, throat, and lungs	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Beryllium	7440-41-7	None	0.002 mg/m^3 4 mg/m^3	Soil	inhalation, skin, and/or eye contact	berylliosis (chronic exposure): anorexia, weight loss, lassitude (weakness, exhaustion), chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation to the eyes; dermatitis; [potential occupational carcinogen]	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.15	Beta BHC Beta Hexachlorocyclohexane 1-alpha,2-beta,3-alpha,4-beta,5-alpha,6-beta-Hexachlorocyclohexane beta-1,2,3,4,5,6-Hexachlorocyclohexane Beta-BHC	319-85-7	None	NA NA	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Beta-Endosulfan Beta Endosulfan Endosulfan II (beta) Endosulfan II	33213-65-9	None	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation skin; nausea, confusion, agitation, flushing, dry mouth, tremor, convulsions, headache; in animals: kidney, liver injury; decreased testis weight

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Bis(2-ethylhexyl)phthalate Bis(2-Ethylhexyl) Phthalate Di-sec octyl phthalate DEHP Di(2-ethylhexyl)phthalate Octyl phthalate bis(2-ethylexyl)phthalate	117-81-7	None	5 mg/m^3 5000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, mucous membrane; in animals: liver damage; teratogenic effects; [potential occupational carcinogen	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Cadmium	7440-43-9	None	0.005 mg/m^3 9 mg/m^3	Soil	inhalation, ingestion	pulmonary edema, dyspnea (breathing difficulty), cough, chest tightness, substernal (occurring beneath the sternum) pain; headache; chills, muscle aches; nausea, vomiting, diarrhea; anosmia (loss of the sense of smell), emphysema, proteinuria, mild anemia; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Calcium	7440-70-2	None	NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, upper resp tract; ulcer, perforation nasal septum; pneumonitis; dermatitis	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Carbon disulfide	75-15-0	PID	20 ppm 500 ppm	Soil Groundwater Vapor	inhalation, skin, or eye contact, ingestion	irritation to the eyes, skin, respiratory system	Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid) Breathing: Respiratory support
1.3.1 – 1.3.15	Carbon tetrachloride Carbon chloride Carbon tet Freon® 10 Halon® 104 Tetrachloromethane	56-23-5	PID	10 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Chloride	16887-00-6	None	1 ppm 10 ppm	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Chlorobenzene benzene chloride monochlorobenzene Phenyl chloride Chlorobenzol MCB	108-90-7	PID	75 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin, or eye contact, ingestion	irritation to the eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Chloroform Methane trichloride Trichloromethane Chloro-3-methyl phenol	67-66-3	None	50 ppm 500 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dizziness, mental dullness, nausea, confusion; headache, lassitude (weakness, exhaustion); anesthesia; enlarged liver; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Chromium Total Chromium Chromium, Total	7440-47-3	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Chrysene Benzo[a]phenanthrene 1,2-Benzphenanthrene	218-01-9	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eye, skin, and respiratory, gastrointestinal irritation nausea, vomit, diarrhea [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	cis-1,2-Dichloroethylene cis-1,2-Dichloroethene	156-59-2	NA	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Cobalt	7440-48-4	None	0.1mg/m^3 20 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	Cough, dyspnea (breathing difficulty), wheezing, decreased pulmonary function; weight loss; dermatitis; diffuse nodular fibrosis; resp hypersensitivity, asthma	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Copper	7440-50-8	None	1.0 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose, metallic taste; dermatitis; anemia	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Cumene Cumol Isopropylbenzene 2-Phenyl propane 1-methylethy lbenzene Isopropyl Benzene	98-82-8	PID	50 ppm 900 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Cyanide	57-12-5	None	5 mg/m^3 25 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	Exposure to cyanide can cause weakness, headaches, confusion, dizziness, fatigue, anxiety, sleepiness, nausea and vomiting. Breathing can speed up then become slow and gasping. Coma, and convulsions also occur. If copious amounts of cyanide have been absorbed by the body, the person usually collapses, and death can occur very quickly. Long-term exposure to lower levels of cyanide can cause skin, and nose irritation, itching, rashes and thyroid changes.	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Cyclohexane Benzene hexahydride Hexahydrobenzene Hexamethylene Hexanaphthene	110-82-7	PID	300 ppm 1300 ppm	Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; drowsiness; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	DDE 4,4-DDE 4,4′-DDE 1,1-bis-(4-chlorophenyl)-2,2-dichloroethene Dichlorodiphenyldichloroethylene p,p'-DDE	72-55-9	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	Oral ingestion of food is the primary source of exposure for the general population. Acute and chronic ingestion may cause nausea, vomiting, diarrhea, stomach pain, headache, dizziness, disorientation, tingling, sensation, kidney damage, liver damage, convulsions, coma, and death. 4,4' DDE may cross the placenta and can be excreted in breast milk	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	DDT 4,4-DDT 4,4′-DDT p,p′-DDT Dichlorodiphenyltrichloroethane 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane	50-29-3	None	1 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; paresthesia tongue, lips, face; tremor; anxiety, dizziness, confusion, malaise (vague feeling of discomfort), headache, lassitude (weakness, exhaustion); convulsions; paresis hands; vomiting; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Delta BHC Delta-BHC Delta-hexachlorocyclohexane Delta Hexachlorocyclohexane	319-86-8	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; headache; nausea; colonic convulsions; resp difficulty; cyanosis; aplastic anemia; muscle spasm; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Dibenz(a,h)anthracene Dibenzo(a,h)anthracene Dibenzo[a,h]anthracene	53-70-3	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support PID Swallow: Medical attention immediately
1.3.1 – 1.3.15	Dibenzofuran	132-64-9	None	NA NA	Soil	inhalation, absorption	irritation to eyes, and skin	Eyes: Irrigate immediately Skin: Soap wash promptly.
1.3.1 – 1.3.15	Dibutyl phthalate Di-n-butyl phthalate Butyl phthalate n-Butyl phthalate 1,2-Benzenedicarboxylic acid dibutyl ester o-Benzenedicarboxylic acid dibutyl ester DBP Palatinol C, Elaol Dibutyl-1,2-benzene-dicarboxylate Di-n-butylphthalate	84-74-2	None	5 mg/m^3 4000 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, upper respiratory system, stomach	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Dichlorodifluoromethane Difluorodichloromethane, Fluorocarbon 12 Freon 12 Freon® 12 Genetron® 12 Halon® 122 Propellant 12 Refrigerant 12 Dichlorodifluromethane	75-71-8	None	1000 pp, 15,000 ppm	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	dizziness, tremor, asphyxia, unconsciousness, cardiac arrhythmias, cardiac arrest; liquid: frostbite	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Dieldrin HEOD 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo exo-5,8-dimethanonaphthalene	60-57-1	PID	0.25 mg/m^3 50 mg/m^3	Groundwater Soil Water	inhalation, skin absorption, ingestion, skin, and/or eye contact	headache, dizziness; nausea, vomiting, malaise (vague feeling of discomfort), sweating; myoclonic limb jerks; colonic, tonic convulsions; coma; [potential occupational carcinogen]; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Diesel Fuel automotive diesel fuel oil No. 2 distillate diesoline diesel oil diesel oil light diesel oil No. 1-D summer diesel	68334-30-5	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Diethyl phthalate DEP Diethyl ester of phthalic acid Ethyl phthalate Diethylphthalate	84-66-2	PID	NA NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation eyes, skin, nose, throat; headache, dizziness, nausea; lacrimation (discharge of tears); polyneuropathy, vestibular dysfunction; pain, numb, lassitude (weakness, exhaustion), spasms in arms & legs; In Animals: reproductive effects	Eye: Irrigate immediately Skin: Wash regularly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	DRO (Diesel Range Organics) C10-C28	75-34-3	PID	500 ppm NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Endosulfan I Alpha Endosulfan	959-98-8	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation skin; nausea, confusion, agitation, flushing, dry mouth, tremor, convulsions, headache; in animals: kidney, liver injury; decreased testis weight	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Endosulfan sulfate 1,4,5,6,7,7-Hexachloro-5-norbornene-2,3-dimethanol, cyclic sulfate 6,7,8,9,10,10-hexachloro01,5,5a,9,9a-hexahydro-6,9-methano-2,4,3-benzodioxathiepin-3,3-dioxide	1031-07-8	None	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	Hypersensitive to stimulation, sensation of prickling, tingling, or creeping on skin. Headache, dizziness, nausea, vomiting, incoordination, tremor, mental confusion, hyperexcitable state. In severe cases: convulsions, seizures, coma, and respiratory depression.	Eye: Irrigate immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Endrin 1,2,3,4,10,10-Hexachloro-6,7-epoxy-1,4,4a,5,6,7,8,8a-octahydro-1,4-endo,endo-5,8-dimethanonaphthalene; Hexadrin	72-20-8	None	0.1 mg/m^3 2 mg/m^3	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	epileptiform convulsions; stupor, headache, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressiveness, confusion; drowsiness, lassitude (weakness, exhaustion); anorexia; in animals: liver damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Ethyl benzene Ethylbenzene Ethylbenzol Phenylethane	100-41-4	PID	435 mg/m^3 3,472 mg/m^3	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; headache; dermatitis; narcosis, coma	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Fluoranthene Benzo(j,k)fluorene	206-44-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Fluorene	86-73-7	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention
1.3.1 – 1.3.15	Fuel Oil No. 2	68476-30-2	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Gasoline	8006-61-9	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Helium	7440-59-7	Helium Detector	NA NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Heptachlor	76-44-8	None	0.5 mg/m^3 35 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	In animals: tremor, convulsions; liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Heptane n-Heptane	142-82-5	PID	500 ppm 750 ppm	Goundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	dizziness, stupor, incoordination; loss of appetite, nausea; dermatitis; chemical pneumonitis (aspiration liquid); unconsciousness	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Hexachlorobenzene Perchlorobenzene Pentachlorophenylchloride Benzene hexachloride Phenyl perchloryl HCB BHC	118-74-1	NA	NA NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	Irritating to eyes, skin, and mucous membranes. Prolonged periods of ingestion may cause cutaneous porphyria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Hexachlorobutadiene HCBD Hexachloro-1,3-butadiene 1,3-Hexachlorobutadiene Perchlorobutadiene	87-68-3	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	In animals: irritation to the eyes, skin, respiratory system; kidney damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Hexavalent Chromium Chromium VI Chromium, Hexavalent	18540-29-9	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Indeno(1,2,3-cd)pyrene Indeno(1,2,3-c,d)Pyrene Indeno[1,2,3-cd]Pyrene	193-39-5	None	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, absorption, ingestion, consumption	irritation to eyes, skin, respiratory, and digestion [potential occupational carcinogen]	Eyes: Irrigate immediately Skin: Soap wash promptly. Breath: Respiratory support Swallow: Medical attention immediately, wash mouth with water
1.3.1 – 1.3.15	Iron	7439-89-6	None	10 mg/m^3 NA	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; abdominal pain, diarrhea, vomiting	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Isophorone 1,1,3-Trimethyl-3-cyclohexene-5-one Isoforone Isoacetophorone	78-59-1	None	25 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Lead	7439-92-1	None	0.050 mg/m^3 100 mg/m^3	Groundwater Soil	inhalation, ingestion, skin, and/or eye contact	lassitude (weakness, exhaustion), insomnia; facial pallor; anorexia, weight loss, malnutrition; constipation, abdominal pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation to the eyes; hypertension	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Lindane Gamma BHC HCH ã-Hexachlorocyclohexane gamma isomer of 1,2,3,4,5,6-Hexachlorocyclohexane gamma-Hexachlorocyclohexane	58-89-9	None	0.5 mg/m^3 50 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; headache; nausea; colonic convulsions; resp difficulty; cyanosis; aplastic anemia; muscle spasm; in animals: liver, kidney damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Magnesium	7439-95-4	None	15 mg/m^3 NA	Soil	inhalation, skin, and/or eye contact	irritation to the eyes, skin, respiratory system; cough	Eye: Irrigate immediately Breathing: Fresh air
1.3.1 – 1.3.15	Manganese	7439-96-5	None	5 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation, ingestion	aerosol is irritating to the respiratory tract	Eye: Irrigate immediately Skin: Soap flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	m-Cresol meta-Cresol 3-Cresol m-Cresylic acid 1-Hydroxy-3-methylbenzene 3-Hydroxytoluene 3-Methylphenol 3-Methylphenols	108-39-4	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Mercury	7439-97-6	None	0.1 mg/m^3 10 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; cough, chest pain, dyspnea (breathing difficulty), bronchitis, pneumonitis; tremor, insomnia, irritability, headache, lassitude (weakness, exhaustion); stomatitis, salivation; gastrointestinal disturbance, anorexia, weight loss; proteinuria	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Methyl Bromide Bromomethane Monobromomethane	74-83-9	PID	20 ppm 250 ppm	Soil Groundwater Vapor	inhalation, skin absorption (liquid), skin, and/or eye contact (liquid)	irritation to the eyes, skin, respiratory system; muscle weak, incoordination, visual disturbance, dizziness; nausea, vomiting, headache; malaise (vague feeling of discomfort); hand tremor; convulsions; dyspnea (breathing difficulty); skin, vesiculation; liquid: frostbite; [potential occupational carcinogen]	Eye: Irrigate immediately (liquid) Skin: Water flush immediately (liquid) Breathing: Respiratory support
1.3.1 – 1.3.15	Methyl chloroform Chlorothene 1,1,1-Trichloroethane 1,1,1-Trichloroethane-(stabilized) 1,1,1-TCA 1,1,1-Trichbroethane TCA	71-55-6	PID	350 ppm 700 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; headache, lassitude (weakness, exhaustion), central nervous system depression, poor equilibrium; dermatitis; cardiac arrhythmias; liver damage	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention
1.3.1 – 1.3.15	Methyl *tert*-butyl ether MTBE Methyl tertiary-butyl ether Methyl t-butyl ether tert-Butyl methyl ether tBME tert-BuOMe Methyl tert butyl ether	1634-04-4	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; burning sensation in chest; headache, nausea, lassitude (weakness, exhaustion), restlessness, incoordination, confusion, drowsiness; vomiting, diarrhea; dermatitis; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Methylene Chloride Dichloromethane Methylene dichloride	75-09-2	PID	25 ppm 2300 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; lassitude (weakness, exhaustion), drowsiness, dizziness; numb, tingle limbs; nausea; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	m-Xylenes 1,3-Dimethylbenzene m-Xylol Metaxylene	108-38-3 179601-23-1	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Naphthalene Naphthalin Tar camphor White tar	91-20-3	PID	50 mg/m^3 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes; headache, confusion, excitement, malaise (vague feeling of discomfort); nausea, vomiting, abdominal pain; irritation bladder; profuse sweating; hematuria (blood in the urine); dermatitis, optical neuritis	Eye: Irrigate immediately Skin: Molten flush immediately/solid-liquid soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	n-Butylbenzene Butylbenzene 1-phenylbutane	104-51-8	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	n-Hexane Hexane, Hexyl hydride, normal-Hexane	110-54-3	PID	500 ppm 1100 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, nose; nausea, headache; peripheral neuropathy: numb extremities, muscle weak; dermatitis; dizziness; chemical pneumonitis (aspiration liquid)	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Nickel	7440-02-0	None	NA 10 mg/m^3	Groundwater Soil	ion, ingestion, skin, and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Nitrobenzene Essence of mirbane Nitrobenzol Oil of mirbane	98-95-3	None	1 ppm 200 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation eyes, skin; anoxia; dermatitis; anemia; methemoglobinemia; In Animals: liver, kidney damage; testicular effects	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	N-Nitrosodimethylamine	62-75-9	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	N-Nitrosodi-n-propylamine N-nitroso-di-n-propylamine	621-64-7	None	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	N-Nitrosodiphenylamine NDFA	86-30-6	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, respiratory system	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Methane Hydrogen Sulfide Carbon Monoxide Nitrogen	 7782-44-7 74-82-8 7783-08-4 830-08-0 7727-37-9	Multi-Gas PID	 NA/NA NA/NA 10/100 ppm 50/1200 ppm NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Non-Flammable Gas Mixture CALGAS (Equipment Calibration Gas : Oxygen Isobutylene Nitrogen	 7782-44-7 115-11-7 7727-37-9	PID	 NA/NA NA/NA NA/NA	NA	inhalation	dizziness, headache, and nausea	Breathing: Respiratory support
1.3.1 – 1.3.15	n-Propylbenzene Isocumene Propylbenzene 1-Phenylpropane 1-Propylbenzene Phenylpropane Propylbenzene-n	103-65-1	PID	NA NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin; dry nose, throat; headache; low blood pressure, tachycardia, abnormal cardiovascular system stress; central nervous system, hematopoietic depression; metallic taste; liver, kidney injury	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	o-Cresol ortho-Cresol 2-Cresol o-Cresylic acid 1-Hydroxy-2-methylbenzene 2-Hydroxytoluene 2-Methyl phenol 2-Methylphenol	95-48-7	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	o-Xylenes 1,2-Dimethylbenzene ortho-Xylene o-Xylol	95-47-6 179601-23-1	PID	100 ppm 900 ppm	Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	p-Cresol para-Cresol 4-Cresol p-Cresylic acid 1-Hydroxy-4-methylbenzene 4-Hydroxytoluene 4-Methylphenol 4-Methylphenols	106-44-5	PID	5 ppm 250 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, mucous membrane; central nervous system effects: confusion, depression, resp failure; dyspnea (breathing difficulty), irregular rapid respiration, weak pulse; eye, skin, burns; dermatitis; lung, liver, kidney, pancreas damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediatelym
1.3.1 – 1.3.15	Pentachlorophenol PCP; Penta; 2,3,4,5,6-Pentachlorophenol	87-86-5	PID	0.5 mg/m^3 2.5 mg/m^3	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; sneezing, cough; lassitude (weakness, exhaustion), anorexia, weight loss; sweating; headache, dizziness; nausea, vomiting; dyspnea (breathing difficulty), chest pain; high fever; dermatitis	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Phenanthrene	85-01-8	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.15	Phenol Carbolic acid Hydroxybenzene, Monohydroxybenzene Phenyl alcohol Phenyl hydroxide	108-95-2	PID	5 ppm 250 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat; anorexia, weight loss; lassitude (weakness, exhaustion), muscle ache, pain; dark urine, skin, burns; dermatitis; tremor, convulsions, twitching	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Potassium	7440-09-7	None	NA NA	Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact inhalation, ingestion, skin, and/or eye contact	eye: Causes eye burns. Skin: Causes skin, burns. Reacts with moisture in the skin, to form potassium hydroxide and hydrogen with heat. ingestion: Causes gastrointestinal tract burns. inhalation: May cause irritation of the respiratory tract with burning pain in the nose and throat, coughing, wheezing, shortness of breath and pulmonary edema. Causes chemical burns to the respiratory tract. inhalation may be fatal because of spasm, inflammation, edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema.	Eyes: Get medical aid immediately Skin: Get medical aid immediately. Immediately flush skin with water for at least 15 minutes while removing contaminated clothing and shoes. Ingestion: If victim is conscious and alert, give 2-4 full cups of milk or water. Get medical aid immediately. inhalation: Get medical aid immediately.
1.3.1 – 1.3.15	p-Xylenes 1,4-Dimethylbenzene para-Xylene p-Xylol	106-42-3	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Pyrene benzo[def]phenanthrene	129-00-0	PID	0.2 mg/m^3 80 mg/m^3 (Coal Pitch Tar)	Groundwater Soil	inhalation, skin, or eye contact, ingestion	irritation to eyes and skin, respiratory irritation (dizziness, weakness, fatigue, nausea, headache)	Eye: Irrigate immediately, refer to medical attention Skin: Soap wash immediately Breathing: move to fresh air Swallow: Medical attention immediately
1.3.1 – 1.3.15	sec-Butylbenzene 2-phenylbutane	135-98-8	PID	10 ppm 100 ppm	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, throat. inhalation: nausea or vomiting	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Selenium	7782-49-2	None	1 mg/m^3 0.2 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; visual disturbance; headache; chills, fever; dyspnea (breathing difficulty), bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin, burns; in animals: anemia; liver necrosis, cirrhosis; kidney, spleen damage	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Silver	7440-22-4	None	0.01 mg/m^3 10 mg/m^3	Soil	inhalation, ingestion, skin, and/or eye contact	blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin; gastrointestinal disturbance	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Silvex 2-(2,4,5-Trichlorophenoxy)propionic acid Fenoprop 2,4,5-TP Acid 2,4,5-TP	93-72-1	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose, respiratory system; headache, lassitude (weakness, exhaustion), dizziness, confusion, malaise (vague feeling of discomfort), drowsiness, unsteady gait; narcosis; defatting dermatitis; liver injury; reproductive effects	Eye: Irrigate immediately Skin: Water flush Breathing: Respiratory support Swallow: Medical attention
1.3.1 – 1.3.15	Sodium	7440-23-5	None	NA NA	Groundwater Soil	ion, ingestion, skin, and/or eye contact	sensitization dermatitis, allergic asthma, pneumonitis; [potential occupational carcinogen]	Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	tert-Butylbenzene *t*-Butylbenzene 2-Methyl-2-phenylpropane Pseudobutylbenzene	98-06-6	PID	10 ppm NA	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	eye, skin, irritation; dry nose, throat; headaches; low blood pressure, tachycardia; abnormal cardiovascular system; central nervous system depression; hematopoietic depression	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Tetrachloroethylene Perchlorethylene Perchloroethylene PCE Perk Tetrachlorethylene Tetrachloroethene	127-18-4	PID	100 ppm 150 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat, respiratory system; nausea; flush face, neck; dizziness, incoordination; headache, drowsiness; skin, erythema (skin, redness); liver damage; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Thallium	7440-28-0	None	0.1 mg/m^3 15 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Toluene Methyl benzene Methyl benzol Phenyl methane Toluol	108-88-3	PID	200 ppm 500 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, nose; lassitude (weakness, exhaustion), confusion, euphoria, dizziness, headache; dilated pupils, lacrimation (discharge of tears); anxiety, muscle fatigue, paresthesia; dermatitis	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Total PCBs Chlorodiphenyl (42% chlorine) Aroclor® 1242 PCB Polychlorinated biphenyl	53469-21-9	None	0.5 mg/m^3 5 mg/m^3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, chloracne	Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Total Xylenes Dimethylbenzene Xylol	1330-20-7	PID	100 ppm 900 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, nose, throat; dizziness, excitement, drowsiness, incoordination, staggering gait; corneal vacuolization; nausea, vomiting, abdominal pain; dermatitis	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Trans-1,2-Dichloroethene trans-1,2-Dichloroethylene tDEC trans-Acetylene dichloride	156-60-5	PID	200 ppm 4000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	Irritant to eyes, skin, mucous membranes, and respiratory system. May be harmful by ingestion, skin absorption and inhalation	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Trichloroethylene Trichloroetheneylenes Ethylene trichloride TCE Trichloroethene Trilene	79-01-6	PID	100 ppm 1000 ppm	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Trichlorofluoromethane Fluorotrichloromethane Freon® 11 Monofluorotrichloromethane Refrigerant 11 Trichloromonofluoromethane Freon 11	75-69-4	PID	1000 ppm 2000 ppm	Groundwater Soil Vapor	inhalation, ingestion, skin, and/or eye contact	incoordination, tremor; dermatitis; cardiac arrhythmias, cardiac arrest; asphyxia; liquid: frostbite	Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Trivalent Chromium Chromium III Chromium, Trivalent	NA	None	1.0 mg/m^3 250 mg/m^3	Groundwater Soil	inhalation absorption ingestion	irritation to eye, skin, and respiratory	Eye: Irrigate immediately Skin: Soap wash Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Vanadium	7440-62-2	None	0.1 mg/m3 15 mg/m3	Groundwater Soil	inhalation, skin absorption, ingestion, skin, and/or eye contact	nausea, diarrhea, abdominal pain, vomiting; ptosis, strabismus; peri neuritis, tremor; retrosternal (occurring behind the sternum) tightness, chest pain, pulmonary edema; convulsions, chorea, psychosis; liver, kidney damage; alopecia; paresthesia legs	Eye: Irrigate immediately Skin: Water flush promptly Breathing: Respiratory support Swallow: Medical attention immediately
1.3.1 – 1.3.15	Vinyl Chloride Chloroethene Chloroethylen Ethylene monochloride Monochloroethene Monochloroethylene VC Vinyl chloride monomer (VCM)	75-01-4	PID	1 ppm NA	Groundwater Soil Vapor	inhalation, skin, and/or eye contact (liquid)	lassitude (weakness, exhaustion); abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid: frostbite; [potential occupational carcinogen]	Eye: Frostbite Skin: Frostbite Breathing: Respiratory support
1.3.1 – 1.3.15	Vinylidene chloride 1,1-DCE 1,1-Dichloroethene 1,1-Dichloroethylene VDC Vinylidene chloride monomer Vinylidene dichloride	75-35-4	PID	NA NA	Groundwater Soil Vapor	inhalation, skin absorption, ingestion, skin, and/or eye contact	irritation to the eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; [potential occupational carcinogen]	Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately

Task	Contaminant	CAS Number	Monitoring Device	PEL/ IDLH	Source of Concentration on Site	Route of Exposure	Symptoms	First Aid
1.3.1 – 1.3.15	Zinc	7440-62-2	None	15 mg/m^3 500 mg/m^3	Groundwater Soil	inhalation	chills, muscle ache, nausea, fever, dry throat, cough; lassitude (weakness, exhaustion); metallic taste; headache; blurred vision; low back pain; vomiting; malaise (vague feeling of discomfort); chest tightness; dyspnea (breathing difficulty), rales, decreased pulmonary function	Eye: Irrigate immediately Skin: Soap wash promptly Breathing: Respiratory support Swallow: Medical attention immediately

EXPLANATION OF ABBREVIATIONS

PID = Photoionization Detector
PEL = Permissible Exposure Limit (8-hour Time Weighted Average)
IDLH = Immediately Dangerous to Life and Health
ppm = part per million
mg/m^3 = milligrams per cubic meter
500 mg/m^3

TABLE 3
SUMMARY OF MONITORING EQUIPMENT

Instrument	Operation Parameters
Photoionization Detector (PID)	**Hazard Monitored:** Many organic and some inorganic gases and vapors. **Application:** Detects total concentration of many organic and some inorganic gases and vapors. Some identification of compounds is possible if more than one probe is measured. **Detection Method:** Ionizes molecules using UV radiation; produces a current that is proportional to the number of ions. **General Care/Maintenance:** Recharge or replace battery. Regularly clean lamp window. Regularly clean and maintain the instrument and accessories. **Typical Operating Time:** 10 hours. 5 hours with strip chart recorder.
Oxygen Meter	**Hazard Monitored:** Oxygen (O_2). **Application:** Measures the percentage of O_2 in the air. **Detection Method:** Uses an electrochemical sensor to measure the partial pressure of O_2 in the air and converts the reading to O_2 concentration. **General Care/Maintenance:** Replace detector cell according to manufacturer's recommendations. Recharge or replace batteries prior to explanation of the specified interval. If the ambient air is less than 0.5% C O_2, replace the detector cell frequently. **Typical Operating Time:** 8 – 12 hours.
Additional equipment (if needed, based on site conditions)	
Combustible Gas Indicator (CGI)	**Hazard Monitored:** Combustible gases and vapors. **Application:** Measures the concentration of combustible gas or vapor. **Detection Method:** A filament, usually made of platinum, is heated by burning the combustible gas or vapor. The increase in heat is measured. Gases and vapors are ionized in a flame. A current is produced in proportion to the number of carbon atoms present. **General Care/Maintenance:** Recharge or replace battery. Calibrate immediately before use. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.
Flame Ionization Detector (FID) with Gas Chromatography Option *(i.e., Foxboro Organic Vapor Analyzer (OVA))*	**Hazard Monitored:** Many organic gases and vapors (approved areas only). **Application:** In survey mode, detects the concentration of many organic gases and vapors. In gas chromatography (GC) mode, identifies and measures specific compounds. In survey mode, all the organic compounds are ionized and detected at the same time. In GC mode, volatile species are separated. **General Care/Maintenance:** Recharge or replace battery. Monitor fuel and/or combustion air supply gauges. Perform routine maintenance as described in the manual. Check for leaks. **Typical Operating Time:** 8 hours; 3 hours with strip chart recorder.
Potable Infrared (IR) Spectrophotometer	**Hazard Monitored:** Many gases and vapors. **Application:** Measures concentration of many gases and vapors in air. Designed to quantify one or two component mixtures. **Detection Method:** Passes different frequencies of IR through the sample. The frequencies absorbed are specific for each compound. **General Care/Maintenance:** As specified by the manufacturer.

Instrument	Operation Parameters
Direct Reading Colorimetric Indicator Tube	**Hazard Monitored:** Specific gas and vapors. **Application:** Measures concentration of specific gases and vapors. **Detection Method:** The compound reacts with the indicator chemical in the tube, producing a stain whose length or color change is proportional to the compound's concentration. **General Care/Maintenance:** Do not use a previously opened tube even if the indicator chemical is not stained. Check pump for leaks before and after use. Refrigerate before use to maintain a shelf life of about 2 years. Check expiration dates of tubes. Calibrate pump volume at least quarterly. Avoid rough handling which may cause channeling.
Aerosol Monitor	**Hazard Monitored:** Airborne particulate (dust, mist, fume) concentrations. **Application:** Measures total concentration of semi-volatile organic compounds, PCBs, and metals. **Detection Method:** Based on light-scattering properties of particulate matter. Using an internal pump, air sample is drawn into the sensing volume where near infrared light scattering is used to detect particles. **General Care/Maintenance:** As specified by the mfr. Also, the instrument must be calibrated with particulates of a size and refractive index similar to those to be measured in the ambient air.
Monitox	**Hazard Monitored:** Gases and vapors. **Application:** Measures specific gases and vapors. **Detection Method:** Electrochemical sensor specific for the chemical species in question. **General Care/Maintenance:** Moisten sponge before use; check the function switch; change the battery when needed.
Gamma Radiation Survey Instrument	**Hazard Monitored:** Gamma Radiation. **Application:** Environmental radiation monitor. **Detection Method:** Scintillation detector. **General Care/Maintenance:** Must be calibrated annually at a specialized facility. **Typical Operating Time:** Can be used for as long as the battery lasts, or for the recommended interval between calibrations, whichever is less.

TABLE 4
INSTRUMENTATION ACTION LEVELS

Photoionization Detector Action Levels	Action Required
Background to 5 parts per million (ppm)[1]	No respirator needed; no further action
>5ppm but </= 15 ppm at the perimeter of the work area	• Work temporarily halted and monitoring continues. • If instantaneous readings decrease below 5 ppm above background, work activities will resume with continued monitoring
>5ppm but </= 25 ppm at the downwind perimeter of the hot zone	• Work activities will be halted. • Source of vapors identified. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators and work can resume if vapor levels 200 feet downwind or the hot zone or half the distance to the nearest potential receptor or residential or commercial structure, whichever is less – but in no case less than 20 feet – is below 5 ppm above background for the 15-minute average
>25ppm at the parameter of the hot zone	Activities will shut down

Particulate Monitoring Action Levels	Action Required
Background to 100 micrograms per cubic meter (µg/m³)[2], no dust observed	No further action
Background to 100 µg/m³, dust observed leaving the work area	Dust suppression must be employed.
100 to 150 µg/m³ at the downwind parameter of the hot zone	• Work activities will be halted. • Source of dust identified. • Dust suppression activities initiated. • Corrective actions taken to abate emissions. • Continued monitoring. • Workers will don appropriate respirators. • Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM10 concentration to within 150 µg/m³ of the upwind level and in preventing visible dust migration.
>150 µg/m³ at the parameter of the hot zone	Activities will shut down

[1] VOC concentrations are 15-minute averages above site background (upwind parameter)
[2] Particulate concentrations are 15-minute averages above site background (upwind parameter)

TABLE 5
EMERGENCY NOTIFICATION LIST

ORGANIZATION	CONTACT	TELEPHONE
Local Police Department		911
Local Fire Department		911
Ambulance/Rescue Squad		911
Hospital	New York-Presbyterian Allen Hospital	911 or 212-932-4000
Langan Incident Hotline		973-560-4699
Medical Treatment Hotline	WorkCare™	911 or 888-449-7757
Langan Environmental Project Manager	Kristen Wexler	646-632-7082 (cell)
Langan Construction Health and Safety Manager (HSM)	Tony Moffa	215-756-2523 (cell)
Langan Health & Safety Officer (HSO)	William Bohrer	410-984-3068 (cell)
Langan Field Team Leader (FTL)	To Be Determined	
Client's Representative	Jorge Madruga	516-821-2003
National Response Center (NRC)		800-424-8802
Chemical Transportation Emergency Center (Chemtrec)		800-424-9300
Center for Disease Control (CDC)		404-639-3534
EPA (RCRA Superfund Hotline)		800-424-9346
TSCA Hotline		202-554-1404
Poison Control Center		800-222-1222

Immediately following an injury, unless immediate emergency medical treatment is required, the injured employee must contact WorkCare - Incident Intervention® at 888-449-7787.

For all other incidents or near misses, unless emergency response is required, either the employee or a coworker must contact the Langan Incident Hotline at 973-560-4699.

TABLE 6
SUGGESTED FREQUENCY OF PHYSIOLOGICAL MONITORINGFOR FIT AND ACCLIMATED WORKERS[A]

Adjusted Temperature[b]	Normal Work Ensemble[c]	Impermeable Ensemble
90°F or above (32.2°C) or above	After each 45 min. of work	After each 15 min. of work
87.5°F (30.8°-32.2°C)	After each 60 min. of work	After each 30 min. of work
82.5°-87.5°F (28.1°-30.8°C)	After each 90 min. of work	After each 60 min. of work
77.5°-82.5°F (25.3°-28.1°C)	After each 120 min. of work	After each 90 min. of work
72.5°-77.5°F (22.5°-25.3°C)	After each 150 min. of work	After each 120 min. of work

a For work levels of 250 kilocalories/hour.

b Calculate the adjusted air temperature (ta adj) by using this equation: ta adj ^{o}F = ta ^{o}F + (13 x % sunshine). Measure air temperature (ta) with a standard mercury-in-glass thermometer, with the bulb shielded from radiant heat. Estimate percent sunshine by judging what percent time the sun is not covered by clouds that are thick enough to produce a shadow. (100 percent sunshine = no cloud cover and a sharp, distinct shadow; 0 percent sunshine = no shadows.)

c A normal work ensemble consists of cotton coveralls or other cotton clothing with long sleeves and pants.

TABLE 7
HEAT INDEX

	ENVIRONMENTAL TEMPERATURE (Fahrenheit)										
	70	**75**	**80**	**85**	**90**	**95**	**100**	**105**	**110**	**115**	**120**
RELATIVE HUMIDITY	**APPARENT TEMPERATURE***										
0%	64	69	73	78	83	87	91	95	99	103	107
10%	65	70	75	80	85	90	95	100	105	111	116
20%	66	72	77	82	87	93	99	105	112	120	**130**
30%	67	73	78	84	90	96	104	113	123	**135**	**148**
40%	68	74	79	86	93	101	110	123	**137**	**151**	
50%	69	75	81	88	96	107	120	**135**	**150**		
60%	70	76	82	90	100	114	**132**	**149**			
70%	70	77	85	93	106	124	**144**				
80%	71	78	86	97	113	**136**					
90%	71	79	88	102	122						
100%	72	80	91	108							

*Combined Index of Heat and Humidity...what it "feels like" to the body

Source: National Oceanic and Atmospheric Administration

How to use Heat Index:

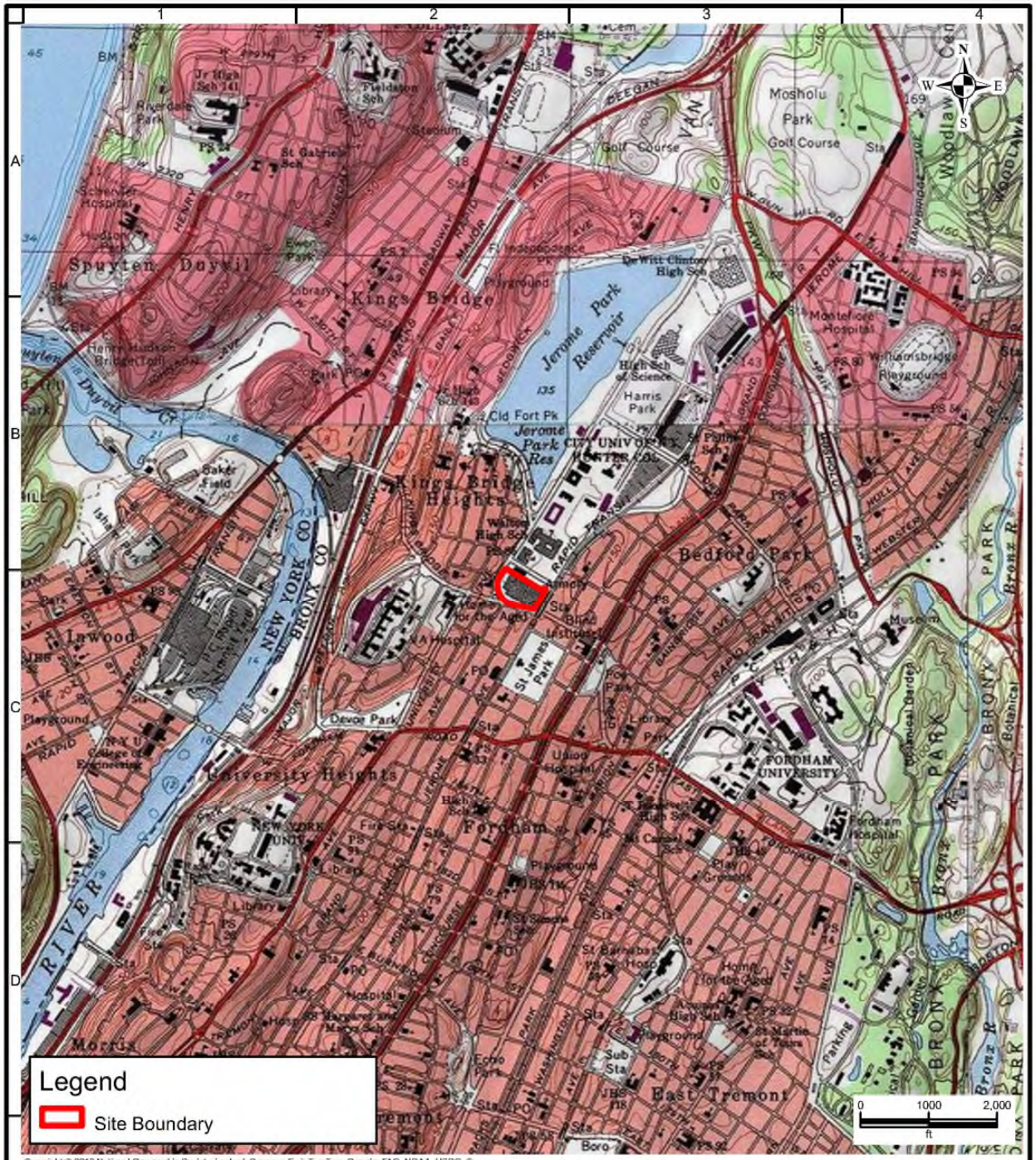
1. Across top locate Environmental Temperature
2. Down left side locate Relative Humidity
3. Follow across and down to find Apparent Temperature
4. Determine Heat Stress Risk on chart at right

Note: Exposure to full sunshine can increase Heat Index values by up to 15 degrees F.

Apparent Temperature	**Heat Stress Risk with Physical Activity and/or Prolonged Exposure**
90-105	Heat Cramps or Heat Exhaustion Possible
105-130	Heat Cramps or Heat Exhaustion Likely, Heat Stroke Possible
>130	Heatstroke Highly Likely

FIGURES

FIGURE 1
SITE LOCATION MAP



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Langan International
Collectively known as Langan

Project	Figure Title	Project No.	Figure
Kingsbridge Armory BRONX BRONX COUNTY NY	SITE LOCATION	170900201	1
		Date: 5/19/2026	
		Scale: 1 inch = 2,000 feet	
		Drawn By: Site Analyzer	
		Submission Date: 5/19/2026	Sheet 1 of 1

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Disclaimer: This information is produced by an automated system and may not be complete. The absence of a feature is not a confirmation that the feature is not present at the subject location. Information produced is in the public domain and unless noted has not been field verified or provided for any specific use. Users are also cautioned to confirm the information shown is suitable for their intended use. Spatial Reference: NAD 1983 StatePlane New York Long Island FIPS 3104 Feet. Projection: emptyStr=Lambert

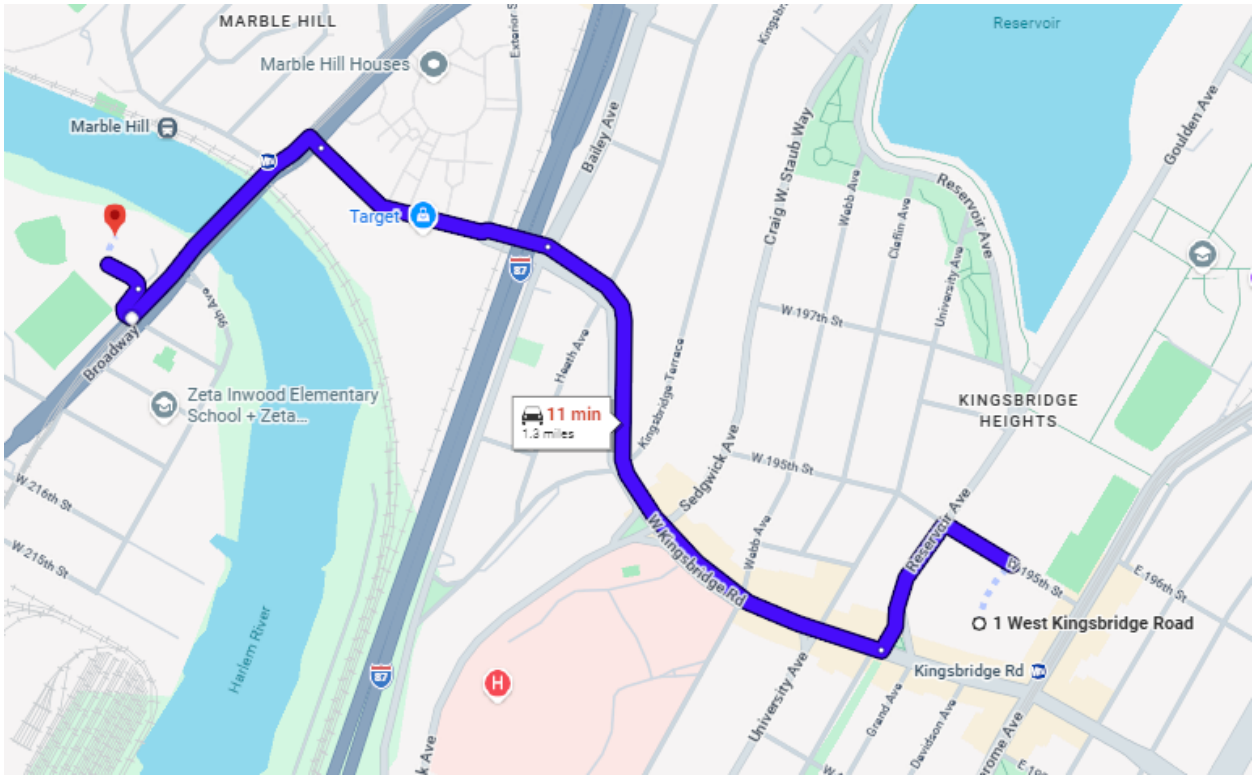
FIGURE 2
HOSPITAL ROUTE PLAN

Hospital Location: **New York-Presbyterian Allen Hospital**
5141 Broadway
New York, New York
212-932-4000

START: Kingsbridge Armory, 1 West Kingsbridge Road, Bronx, New York

1. Head toward Reservoir Ave
2. Turn left at the 1st cross street onto Reservoir Ave
3. Turn right onto West Kingsbridge Rd
4. Continue onto W 225th St
5. Turn left onto US-9/Broadway
6. Turn right onto W 220th St, destination will be on the right.

END: New York-Presbyterian Allen Hospital, 5141 Broadway, New York, New York



ATTACHMENTS

ATTACHMENT A

STANDING ORDERS

STANDING ORDERS

GENERAL

- No smoking, eating, or drinking in this work zone.
- Upon leaving the work zone, personnel will thoroughly wash their hands and face.
- Minimize contact with contaminated materials through proper planning of work areas and decontamination areas, and by following proper procedures. Do not place equipment on the ground. Do not sit on contaminated materials.
- No open flames in the work zone.
- Only properly trained and equipped personnel are permitted to work in potentially contaminated areas.
- Always use the appropriate level of personal protective equipment (PPE).
- Maintain close contact with your buddy in the work zone.
- Contaminated material will be contained in the Exclusion Zone (EZ).
- Report any unusual conditions.
- Work areas will be kept clear and uncluttered. Debris and other slip, trip, and fall hazards will be removed as frequently as possible.
- The number of personnel and equipment in the work zone will be kept to an essential minimum.
- Be alert to the symptoms of fatigue and heat/cold stress, and their effects on the normal caution and judgment of personnel.
- Conflicting situations which may arise concerning safety requirements and working conditions must be addressed and resolved quickly by the site HSO.

TOOLS AND HEAVY EQUIPMENT

- Do not, under any circumstances, enter or ride in or on any backhoe bucket, materials hoist, or any other device not specifically designed to carry passengers.
- Loose-fitting clothing or loose long hair is prohibited around moving machinery.
- Ensure that heavy equipment operators and all other personnel in the work zone are using the same hand signals to communicate.
- Drilling/excavating within 10 feet in any direction of overhead power lines is prohibited.
- The locations of all underground utilities must be identified and marked out prior to initiating any subsurface activities.
- Check to ensure that the equipment operator has lowered all blades and buckets to the ground before shutting off the vehicle.
- If the equipment has an emergency stop device, have the operator show all personnel its location and how to activate it.
- Help the operator ensure adequate clearances when the equipment must negotiate in tight quarters; serve as a signal operator to direct backing, as necessary.
- Ensure that all heavy equipment that is used in the Exclusion Zone is kept in that zone until the job is done and that such equipment is completely decontaminated before moving it into the clean area of the work zone.
- Samplers must not reach into or get near rotating equipment such as the drill rig. If personnel must work near any tools that could rotate, the equipment operator must completely shut down the rig prior to initiating such work. It may be necessary to use a remote sampling device.

ATTACHMENT B

DECONTAMINATION PROCEDURES

PERSONNEL DECONTAMINATION

LEVEL C DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross-contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves, and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Canister or Mask Change	4. If worker leaves Exclusion Zone to change canister (or mask), this is the last step in the decontamination procedure. Worker's canister is exchanged, new outer gloves and boot covers donned, joints taped, and worker returns to duty.
Station 5:	Boot, Gloves and Outer Garment Removal	5. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 6:	Face piece Removal	6. Face piece is removed (avoid touching face with fingers). Face piece deposited on plastic sheets.
Station 7:	Field Wash	7. Hands and face are thoroughly washed. Shower as soon as possible.

LEVEL D DECONTAMINATION

Station 1:	Equipment Drop	1. Deposit equipment used on-site (tools, sampling devices and containers, monitoring instruments, radios, clipboards, etc.) on plastic drop cloths. Segregation at the drop reduces the probability of cross contamination. During hot weather operations, cool down stations may be set up within this area.
Station 2:	Outer Garment, Boots, and Gloves Wash and Rinse	2. Scrub outer boots, outer gloves and chemical-resistant splash suit with decon solution or detergent and water. Rinse off using copious amounts of water.
Station 3:	Outer Boot and Glove Removal	3. Remove outer boots and gloves. Deposit in container with plastic liner.
Station 4:	Boot, Gloves and Outer Garment Removal	4. Boots, chemical-resistant splash suit, inner gloves removed and deposited in separate containers lined with plastic.
Station 5:	Field Wash	5. Hands and face are thoroughly washed. Shower as soon as possible.

EQUIPMENT DECONTAMINATION

GENERAL:

Equipment to be decontaminated during the project may include tools, monitoring equipment, respirators, sampling containers, laboratory equipment, and drilling equipment.

All decontamination will be done by personnel in protective gear, appropriate for the level of decontamination, as determined by the site HSO. The decontamination work tasks will be split or rotated among support and work crews.

Depending on site conditions, backhoes and pumps may be decontaminated over a portable decontamination pad to contain wash water; or wash water may be allowed to run off into a storm sewer system. Equipment needed may include a steam generator with high-pressure water, empty drums, screens, screen support structures, and shovels. Drums will be used to hold contaminated wash water pumped from the lined pit. These drums will be labeled as such.

Miscellaneous tools and equipment will be dropped into a plastic bucket, tub, or other containers. They will be brushed off and rinsed with a detergent solution, and finally rinsed with clean water.

MONITORING EQUIPMENT:

Monitoring equipment will be protected as much as possible from contamination by draping, masking, or otherwise covering as many of the instruments as possible with plastic without hindering the operation of the unit. The PID, HNu, or OVA meter, for example, can be placed in a clear plastic bag, which allows reading of the scale and operation of knobs. The probes can be partially wrapped keeping the sensor tip and discharge port clear.

The contaminated equipment will be taken from the drop area and the protective coverings removed and disposed of in the appropriate containers. Any dirt or obvious contamination will be brushed or wiped with a disposable paper wipe.

RESPIRATORS:

Respirators will be cleaned and disinfected after every use. Taken from the drop area, the masks (with the cartridges removed and disposed of with other used disposable gear) will be immersed in a cleaning solution and scrubbed gently with a soft brush, followed by a rinse in plain warm water, and then allowed to air dry. In the morning, new cartridges will be installed. Personnel will inspect their own masks for serviceability prior to donning them. And, once the mask is on, the wearer will check the respirator for leakage using the negative and positive pressure fit check techniques.

ATTACHMENT C

EMPLOYEE EXPOSURE/INJURY INCIDENT REPORT

EMPLOYEE INCIDENT/INJURY REPORT
LANGAN ENGINEERING & ENVIRONMENTAL SERVICES

(Complete and return to Tony Moffa in the Doylestown Office)

Affected Employee Name: _____ Date: _____

Incident type: ☐ Injury ☐ Report Only/No Injury
☐ Near Miss ☐ Other: _____

EMPLOYEE INFORMATION (Person completing Form)

Employee Name: _____ Employee No: _____

Title: _____ Office Location: _____

Length of time employed or date of hire: _____

Mailing address: _____

_____

Sex: M ☐ F ☐ Birth date: _____

Business phone & extension: _____ Residence/cell phone: _____

ACCIDENT INFORMATION

Project: _____ Project #: _____

Date & time of incident: _____ Time work started & ended: _____

Site location: _____

Incident Type: Possible Exposure ☐ Exposure ☐ Physical Injury ☐

Names of person(s) who witnessed the incident:_____

_____

_____

Exact location incident occurred:

_____

_____

Describe work being done:_____

_____

_____

_____

Describe what affected employee was doing prior to the incident occurring:

_____

_____

_____

Describe in detail how the incident occurred:

_____

_____

_____

_____

Nature of the incident (List the parts of the body affected):

_____

_____

_____

_____

Person(s) to whom the incident was reported (Time and Date):

_____

_____

List the names of other persons affected during this incident:

_____

_____

Possible causes of the incident (equipment, unsafe work practices, lack of PPE, etc.):

Weather conditions during incident:

MEDICAL CARE INFORMATION

Did affected employee receive medical care? Yes ☐ No ☐

If Yes, when, and where was medical care received:

Provide name of facility (hospital, clinic, etc.):

Length of stay at the facility.

Did the employee miss any work time? Yes ☐ No ☐ Undetermined ☐

Date employee last worked: _____ Date employee returned to work:

Has the employee returned to work? Yes ☐ No ☐

Does the employee have any work limitations or restrictions from the injury? : Yes ☐ No ☐

If Yes, please describe:

Did the exposure/injury result in permanent disability? Yes ☐ No ☐ Unknown ☐

If Yes, please describe:

HEALTH & SAFETY INFORMATION

Was the operation being conducted under an established site-specific Construction Health and Safety Plan?
Yes ☐ No ☐ Not Applicable: ☐

Describe protective equipment and clothing used by the employee:

_____

_____

_____

Did any limitations in safety equipment or protective clothing contribute to or affect exposure/injury? If so, explain:

_____

_____

_____

_____

Employee Signature Date

_____

Langan Representative Date

ATTACHMENT D

CALIBRATION LOG

DATE:________________ PROJECT:____________________

CALIBRATION LOG

Date & Time	Inst Type	Inst #	Media	Initial Reading	Span #	Calibrate Reading	Performed By:

ATTACHMENT E

SAFETY DATA SHEETS

SAFETY DATA SHEET

Version 5.4
Revision Date 03/05/2015
Print Date 02/19/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Freon® 113 solution

Product Number : 48411
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Specific target organ toxicity - single exposure (Category 1), H370

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H370	Causes damage to organs.

Precautionary statement(s)

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.

P304 + P340 + P311	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P307 + P311	IF exposed: Call a POISON CENTER or doctor/ physician.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Synonyms : 1,1,2-Trichloro-1,2,2-trifluoroethanesolution

Hazardous components

Component		Classification	Concentration
Methanol			
CAS-No.	67-56-1	Flam. Liq. 2; Acute Tox. 3; STOT SE 1; H225, H301 + H311 + H331, H370	>= 90 - <= 100 %
EC-No.	200-659-6		
Index-No.	603-001-00-X		
Registration number	01-2119433307-44-XXXX		

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Methanol	67-56-1	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		
		STEL	250.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Headache Nausea Dizziness Eye damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Danger of cutaneous absorption		

		TWA	200.000000 ppm 260.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	250.000000 ppm 325.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	200.000000 ppm 260.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Methanol	67-56-1	Methanol	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls.

If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Zinc, Acids, Oxidizing agents, Alkali metals, Powdered metals, Potassium, Acid chlorides, Acid anhydrides, Reducing agents, Aluminum, Sodium/sodium oxides, Magnesium

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Methyl alcohol may be fatal or cause blindness if swallowed., Cannot be made non-poisonous., Effects due to ingestion may include:, Nausea, Dizziness, Gastrointestinal disturbance, Weakness, Confusion., Drowsiness, Unconsciousness, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1230 Class: 3 Packing group: II
Proper shipping name: Methanol
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1230 Class: 3 (6.1) Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHANOL

IATA
UN number: 1230 Class: 3 (6.1) Packing group: II
Proper shipping name: Methanol

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

1,1,2-Trichlorotrifluoroethane	76-13-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Methanol	67-56-1	2007-07-01

California Prop. 65 Components

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.	CAS-No.	Revision Date
Methanol	67-56-1	2012-03-16

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H331	Toxic if inhaled.
H370	Causes damage to organs.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 03/05/2015 Print Date: 02/19/2016

SAFETY DATA SHEET

Version 5.3
Revision Date 12/29/2015
Print Date 04/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,1-Dichloroethane

Product Number : 48512
Brand : Supelco
Index-No. : 602-011-00-1

CAS-No. : 75-34-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Oral (Category 4), H302
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H302 Harmful if swallowed.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.

P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Ethylidene chloride
Formula	:	$C_2H_4Cl_2$
Molecular weight	:	98.96 g/mol
CAS-No.	:	75-34-3
EC-No.	:	200-863-5
Index-No.	:	602-011-00-1

Hazardous components

Component	Classification	Concentration
1,1-Dichloroethane		
	Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2A; STOT SE 3; Aquatic Acute 3; Aquatic Chronic 3; H225, H302, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,1-Dichloroethane	75-34-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Liver damage Kidney damage Not classifiable as a human carcinogen		
		TWA	100.000000 ppm 400.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		See Appendix C		
		TWA	100.000000 ppm 400.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 60 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering

controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-97.99 °C (-144.38 °F)
f)	Initial boiling point and boiling range	55.0 - 58.0 °C (131.0 - 136.4 °F)
g)	Flash point	-9.99 °C (14.02 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.17 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 725.0 mg/kg

LC50 Inhalation - Rat - 4 h - 13000 ppm

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Chronic exposure may cause dermatitis.

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KI0175000

Liver injury may occur., Kidney injury may occur., narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2362 Class: 3 Packing group: II
Proper shipping name: 1,1-Dichloroethane
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2362 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,1-DICHLOROETHANE

IATA
UN number: 2362 Class: 3 Packing group: II
Proper shipping name: 1,1-Dichloroethane

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
1,1-Dichloroethane	75-34-3	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3 Revision Date: 12/29/2015 Print Date: 04/11/2016

M A T E R I A L S A F E T Y D A T A S H E E T

SECTION 1 - PRODUCT AND COMPANY IDENTIFICATION

Company: AccuStandard, Inc.
125 Market Street
New Haven, CT 06513

Date MSDS Printed: 4/21/2006
Preparation Date: 4/21/2006
Information Phone Number: 203-786-5290
Emergency Phone Number: 203-786-5290
Hours: Mon. to Fri. 8am-5pm EDT

MSDS Number: V-029
Product Name: 1,2,4-Trimethylbenzene
Synonyms: 1,2,4-Trimethylbenzene; Pseudocumene; psi-Cumene; Assymetrical trimethylbenzene
Formula: C_9H_{12} Molecular Weight: 120.19

SECTION 2 - COMPOSITION / INFORMATION ON INGREDIENTS

Component(s) (1)	CAS #	Appr. %	ACGIH-TLV (mg/m3) TWA	ACGIH-TLV (mg/m3) STEL skin	OSHA-PEL (mg/m3) TWA	OSHA-PEL (mg/m3) STEL skin
1,2,4-Trimethylbenzene	95-63-6	100	123			

SECTION 3 - HAZARDS IDENTIFICATION

Symptoms of Exposure:

Irritating to eyes, skin, mucous membranes and upper respiratory system.

Narcotic in high concentrations.

May cause headache, dizziness, nausea, and narcosis.

May cause stomach cramps and gastro-intestinal disturbances.

To the best of our knowledge the chemical, physical and toxicological properties of the component ingredients have not been thoroughly investigated.

Potential Health Effects:

Harmful if inhaled.

May be harmful if absorbed through skin or swallowed

May cause central nervous system damage.

Routes of Entry:

Inhalation, ingestion or skin contact.

Carcinogenicity:

This product is or contains a component that is not listed (ACGIH, IARC, NTP, OSHA) as a cancer causing agent.

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SECTION 4 - FIRST AID MEASURES

Emergency First Aid:

Get medical assistance for all cases of overexposure.

Skin contact: Immediately wash skin with soap and plenty of water. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

Eye contact: Immediately flush with plenty of water. After initial flushing, remove and contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

Ingestion: Call a physician or poison control center immediately. ONLY induce vomiting at the instructions of a physician. Never give anything by mouth to an unconscious person.

SECTION 5 - FIRE FIGHTING MEASURES

Flammable Properties:

Flash Point: 118.4 °F (48 °C) (cc)

Flammable Limits LEL (%): 0.9

Flammable Limits UEL (%): 6.4

Autoignition Temperature: 515 °C

Flammable liquid and vapor.

Vapors can travel to a source of ignition and flash back.

Containers can build up pressure if exposed to heat.

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Extinguishing Media:

Use alcohol foam, carbon dioxide, dry chemical, or water spray when fighting fires involving this material.

Fire Fighting Procedures:

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill Response:

Wear a self-contained breathing apparatus and appropriate Personal protection. Stop leak if you can do so without risk. Ventilate area. Neutralize spill with soda ash or lime. Take up and containerize for proper disposal. Flush spill area with water. Keep combustibles away from spilled material. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tighly closed container.

Store in a cool area away from ignition sources and oxidizers.

Do not breathe vapor.

Do not get in eyes, on skin or clothing.

Avoid prolonged or repeated exposure.

This product should only by used by persons trained in the safe handling of hazardous chemicals.

SECTION 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering Controls and Personal Protection Equipment (PPE):

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), a NIOSH/MSHA approved air supplied respirator is advised in absence of proper environmental control. OSHA regulations also permit other

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NIOSH/MSHA respirators (negative pressure type) under specified conditions (see your safety equipment supplier). Engineering and/or administrative controls should be implemented to reduce exposure.

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Compatible chemical-resistant protective gloves must be worn to prevent skin contact.

Safety glasses with side shields must be worn at all times.

General Hygiene Considerations:

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, colorless liquid
Odor: Aromatic
pH: N/A
Vapor Pressure: 7 mmHg (44.4 °C)
Vapor Density (Air = 1): 4.2 g/l
Boiling Point: 168 - 169 °C
Melting Point: -43.7 °C
Solubility in Water (%): Insoluble
Specific Gravity (H_2O = 1): 0.876 g/cm3
Flash Point: 118.4 °F (48 °C) (cc)
Explosion Limits (%): 0.9 to 6.4
Autoignition Temperature: 515 °C
Percent Volatile: N/A
Evaporation Rate (BuAc = 1): N/A
Molecular Weight: 120.19
Molecular Formula: C_9H_{12}

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable
Conditions To Avoid: Heat; Contact with ignition sources
Materials To Avoid: Oxidizers

Hazardous Decomposition: Carbon oxides
Hazardous Polymerization: Will not occur

SECTION 11 - TOXICOLOGICAL INFORMATION

See section 3 for specific toxicological information for the ingredients of this product.

SECTION 12 - ECOLOGICAL INFORMATION

By complying with sections 6 and 7 there will be no release to the environment.

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SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

DOT UN Number: UN3295 Shipping Class: 3 Packing Group: III FLAMMABLE

SECTION 15 - REGULATORY INFORMATION

In addition to Federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI and CHIPs regulations.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. It is intended for use only by persons having the necessary technical skill and at their own discretion and risk. Since conditions and manner of use are outside our control, we make
NO WARRANTY, EXPRESSED OR IMPLIED, OF MERCHANTABILITY, FITNESS OR OTHERWISE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

* * * End of Document * * *

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SAFETY DATA SHEET

Version 4.7
Revision Date 11/26/2015
Print Date 02/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,2-Dichlorobenzene

Product Number : 240664
Brand : Sigma-Aldrich
Index-No. : 602-034-00-7

CAS-No. : 95-50-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitisation (Category 1), H317
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H227 Combustible liquid.
H302 + H332 Harmful if swallowed or if inhaled
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.

H335	May cause respiratory irritation.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_6H_4Cl_2$
Molecular weight	:	147.00 g/mol
CAS-No.	:	95-50-1
EC-No.	:	202-425-9
Index-No.	:	602-034-00-7

Hazardous components

Component	Classification	Concentration
1,2-Dichlorobenzene		
	Flam. Liq. 4; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H227, H302 + H332, H315, H317, H319, H335, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,2-Dichlorobenzene	95-50-1	TWA	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		TWA	25 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		STEL	50.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		STEL	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Liver damage Not classifiable as a human carcinogen		
		C	50.000000 ppm 300.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate. Ceiling limit is to be determined from breathing-zone air samples.		
		C	50.000000 ppm 300.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 38 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -18 - -17 °C (0 - 1 °F) - lit.
f)	Initial boiling point and boiling range	178 - 180 °C (352 - 356 °F) - lit.
g)	Flash point	66.0 °C (150.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 9.2 %(V) Lower explosion limit: 2.2 %(V)
k)	Vapour pressure	2.1 hPa (1.6 mmHg) at 35.0 °C (95.0 °F) 1.6 hPa (1.2 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.306 g/cm3 at 25 °C (77 °F)
n)	Water solubility	ca.0.1558 g/l at 25 °C (77 °F) - partly soluble
o)	Partition coefficient: n-octanol/water	log Pow: ca.3.433 at 25 °C (77 °F)
p)	Auto-ignition temperature	648.0 °C (1,198.4 °F)
q)	Decomposition	No data available

temperature

r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	ca.36.61 mN/m

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 500.0 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - > 10,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
(OECD Test Guideline 404)

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
in vivo assay - Mouse
May cause sensitisation by skin contact.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Ames test
Salmonella typhimurium
Result: negative

OECD Test Guideline 474
Mouse - male - Bone marrow
Result: negative

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (1,2-Dichlorobenzene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity	Rat - male and female - Oral - 24 h - NOAEL : 60 mg/kg - LOAEL : 125 mg/kg - OECD Test Guideline 408

RTECS: CZ4500000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 1.58 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Ceriodaphnia dubia (water flea) - 0.66 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - Pseudokirchneriella subcapitata - 2.2 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 0 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 56 d - 0.01 mg/l Bioconcentration factor (BCF): 90 - 260 (OECD Test Guideline 305C)

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1591 Class: 6.1 Packing group: III
Proper shipping name: o-Dichlorobenzene
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1591 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: ortho-DICHLOROBENZENE
Marine pollutant:yes

IATA
UN number: 1591 Class: 6.1 Packing group: III
Proper shipping name: o-Dichlorobenzene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,2-Dichlorobenzene	95-50-1	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox. Acute toxicity

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7 Revision Date: 11/26/2015 Print Date: 02/11/2016

SAFETY DATA SHEET

Creation Date 04-Feb-2010 **Revision Date** 18-Jan-2018 **Revision Number** 6

1. Identification

Product Name **1,2-Dichloroethane**

Cat No. : **E175-4; E175-20; E175-500; E175RS-19; E175RS-50; E190-4**

CAS-No 107-06-2
Synonyms Ethylene dichloride; Ethylene chloride (Certified ACS/Spectranalyzed)

Recommended Use Laboratory chemicals.
Uses advised against Not for food, drug, pesticide or biocidal product use

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 3
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver, Heart, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation

Toxic if inhaled
May cause respiratory irritation
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)

WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Ethylene dichloride	107-06-2	>95

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms and effects Breathing difficulties. May cause cardiac arrhythmia. May cause central nervous system depression: Symptoms may include tightness in the chest, flushing, headache, nausea, vomiting, respiratory depression, weakness, irregular heartbeat, abdominal pain, convulsions, and shock

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media Water may be ineffective

Flash Point 13 °C / 55.4 °F

Method - No information available

Autoignition Temperature 440 °C / 824 °F

Explosion Limits

Upper 15.9 vol %
Lower 6.2 vol %
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Flammable. Containers may explode when heated. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2) Hydrogen chloride gas Phosgene
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	3	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak. Ensure adequate ventilation. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not ingest. Use only under a chemical fume hood. Do not breathe vapors or spray mist. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded. Take precautionary measures against static discharges.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Ethylene dichloride	TWA: 10 ppm	(Vacated) TWA: 1 ppm (Vacated) TWA: 4 mg/m³ Ceiling: 100 ppm (Vacated) STEL: 2 ppm (Vacated) STEL: 8 mg/m³ TWA: 50 ppm	IDLH: 50 ppm TWA: 1 ppm TWA: 4 mg/m³ STEL: 2 ppm STEL: 8 mg/m³	TWA: 10 ppm TWA: 40 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Use explosion-proof electrical/ventilating/lighting/equipment. Ensure that eyewash stations and safety showers are close to the workstation location. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166. Tightly fitting safety goggles. Face-shield.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	sweet
Odor Threshold	400 ppm
pH	No information available
Melting Point/Range	-35 °C / -31 °F
Boiling Point/Range	81 - 85 °C / 177.8 - 185 °F
Flash Point	13 °C / 55.4 °F
Evaporation Rate	6.5 (Butyl Acetate = 1.0)
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	15.9 vol %
Lower	6.2 vol %
Vapor Pressure	65 mmHg @ 29 °C
Vapor Density	3.4
Specific Gravity	1.250
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	440 °C / 824 °F
Decomposition Temperature	No information available
Viscosity	0.8 mPa s at 20 °C
Molecular Formula	C2 H4 Cl2
Molecular Weight	98.96

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Bases, Alkali metals

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas, Phosgene

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Ethylene dichloride	625 mg/kg (Rat) 413 mg/kg (Mouse)	2800 mg/kg (Rabbit)	28.79 mg/L (Rat) 1h 7.8 mg/l (Rat) 4h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Ethylene dichloride	107-06-2	Group 2B	Reasonably Anticipated	Not listed	X	Not listed

IARC: (International Agency for Research on Cancer)

NTP: (National Toxicity Program)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans
NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system Central nervous system (CNS)
STOT - repeated exposure Kidney Liver Heart Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed May cause central nervous system depression: Symptoms may include tightness in the chest, flushing, headache, nausea, vomiting, respiratory depression, weakness, irregular heartbeat, abdominal pain, convulsions, and shock

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Ethylene dichloride	EC50: = 166 mg/L, 96h static (Desmodesmus subspicatus) EC50: > 433 mg/L, 96h (Pseudokirchneriella subcapitata)	LC50: 110 - 123 mg/L, 96h flow-through (Pimephales promelas) LC50: 230 - 710 mg/L, 96h flow-through (Lepomis macrochirus) LC50: = 225 mg/L, 96h static (Oncorhynchus mykiss)	Not listed	EC50: 140 - 190 mg/L, 48h Static (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Ethylene dichloride	1.45

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Ethylene dichloride - 107-06-2	U077	-

14. Transport information

DOT

UN-No	UN1184
Proper Shipping Name	ETHYLENE DICHLORIDE
Hazard Class	3
Subsidiary Hazard Class	6.1
Packing Group	II

TDG

UN-No	UN1184
Proper Shipping Name	ETHYLENE DICHLORIDE
Hazard Class	3
Subsidiary Hazard Class	6.1
Packing Group	II

IATA

UN-No	UN1184
Proper Shipping Name	ETHYLENE DICHLORIDE
Hazard Class	3
Subsidiary Hazard Class	6.1
Packing Group	II

IMDG/IMO

UN-No	UN1184
Proper Shipping Name	ETHYLENE DICHLORIDE
Hazard Class	3
Subsidiary Hazard Class	6.1
Packing Group	II

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Ethylene dichloride	X	X	-	203-458-1	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

Component	TSCA 12(b)
Ethylene dichloride	Section 4

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Ethylene dichloride	107-06-2	>95	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Ethylene dichloride	X	100 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Ethylene dichloride	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Ethylene dichloride	100 lb 1 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Ethylene dichloride	107-06-2	Carcinogen	10 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Ethylene dichloride	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

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Print Date 18-Jan-2018
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Flammable Liquid Mixture: 1,3,5-Trimethylbenzene / Benzene / Ethyl Benzene / Hexane / M-Xylene / N-Propyl Benzene / O-Xylene / Octane / P-Xylene / Toluene

Section 1. Identification

GHS product identifier : Flammable Liquid Mixture: 1,3,5-Trimethylbenzene / Benzene / Ethyl Benzene / Hexane / M-Xylene / N-Propyl Benzene / O-Xylene / Octane / P-Xylene / Toluene

Other means of identification : Not available.

Product use : Synthetic/Analytical chemistry.

SDS # : 017335

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 1
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2A
GERM CELL MUTAGENICITY - Category 1B
CARCINOGENICITY - Category 1
TOXIC TO REPRODUCTION (Fertility) - Category 2
TOXIC TO REPRODUCTION (Unborn child) - Category 2
SPECIFIC TARGET ORGAN TOXICITY (SINGLE EXPOSURE) (Narcotic effects) - Category 3
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (bone marrow) - Category 1
AQUATIC HAZARD (ACUTE) - Category 2
AQUATIC HAZARD (LONG-TERM) - Category 2

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Extremely flammable liquid and vapor.
May form explosive mixtures in Air.
Causes serious eye irritation.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
Suspected of damaging fertility or the unborn child.
May cause drowsiness and dizziness.
Causes damage to organs through prolonged or repeated exposure. (bone marrow)
Toxic to aquatic life with long lasting effects.

Section 2. Hazards identification

Precautionary statements

General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves. Wear eye or face protection. Wear protective clothing. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Use only outdoors or in a well-ventilated area. Avoid release to the environment. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response : Collect spillage. Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or physician if you feel unwell. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Mixture

Other means of identification : Not available.

CAS number/other identifiers

CAS number : Not applicable.

Product code : 017335

Ingredient name	%	CAS number
toluene	10 - 20	108-88-3
benzene	10 - 20	71-43-2
n-hexane	10 - 20	110-54-3
octane	10 - 20	111-65-9
m-xylene	8 - 15	108-38-3
o-xylene	8 - 15	95-47-6
p-xylene	8 - 15	106-42-3
ethylbenzene	1 - 5	100-41-4
mesitylene	1 - 5	108-67-8
propylbenzene	1 - 5	103-65-1

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If necessary, call a poison center or physician. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness.

Skin contact : Causes skin irritation.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : Can cause central nervous system (CNS) depression.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:, pain or irritation, watering, redness

Inhalation : Adverse symptoms may include the following:, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness, reduced fetal weight, increase in fetal deaths, skeletal malformations

Skin contact : Adverse symptoms may include the following:, irritation, redness, reduced fetal weight, increase in fetal deaths, skeletal malformations

Ingestion : Adverse symptoms may include the following:, reduced fetal weight, increase in fetal deaths, skeletal malformations

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Extremely flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. Runoff to sewer may create fire or explosion hazard. This material is toxic to aquatic life with long lasting effects. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities. Collect spillage.

Methods and materials for containment and cleaning up

Section 6. Accidental release measures

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Avoid exposure during pregnancy. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Avoid release to the environment. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
octane	**OSHA PEL 1989 (United States, 3/1989).** TWA: 300 ppm 8 hours. TWA: 1450 mg/m³ 8 hours. STEL: 375 ppm 15 minutes. STEL: 1800 mg/m³ 15 minutes. **NIOSH REL (United States, 10/2013).** TWA: 75 ppm 10 hours. TWA: 350 mg/m³ 10 hours. CEIL: 385 ppm 15 minutes. CEIL: 1800 mg/m³ 15 minutes. **ACGIH TLV (United States, 3/2015).** TWA: 300 ppm 8 hours. **OSHA PEL (United States, 2/2013).** TWA: 500 ppm 8 hours. TWA: 2350 mg/m³ 8 hours.
n-hexane	**ACGIH TLV (United States, 3/2015).** **Absorbed through skin.** TWA: 50 ppm 8 hours. **NIOSH REL (United States, 10/2013).** TWA: 180 mg/m³ 10 hours. TWA: 50 ppm 10 hours. **OSHA PEL (United States, 2/2013).** TWA: 1800 mg/m³ 8 hours. TWA: 500 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 180 mg/m³ 8 hours. TWA: 50 ppm 8 hours.
benzene	**ACGIH TLV (United States, 3/2015).** **Absorbed through skin.** STEL: 8 mg/m³ 15 minutes. STEL: 2.5 ppm 15 minutes. TWA: 1.6 mg/m³ 8 hours. TWA: 0.5 ppm 8 hours. **NIOSH REL (United States, 10/2013).** STEL: 1 ppm 15 minutes. TWA: 0.1 ppm 10 hours. **OSHA PEL (United States, 2/2013).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL Z2 (United States, 2/2013).** AMP: 50 ppm 10 minutes. CEIL: 25 ppm TWA: 10 ppm 8 hours.
toluene	**ACGIH TLV (United States, 3/2015).** TWA: 20 ppm 8 hours. **NIOSH REL (United States, 10/2013).** STEL: 560 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 375 mg/m³ 10 hours. TWA: 100 ppm 10 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 560 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes.

Section 8. Exposure controls/personal protection

	TWA: 375 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **OSHA PEL Z2 (United States, 2/2013).** AMP: 500 ppm 10 minutes. CEIL: 300 ppm TWA: 200 ppm 8 hours.
p-xylene	**NIOSH REL (United States, 10/2013).** STEL: 655 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. **OSHA PEL (United States, 2/2013).** TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 655 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **ACGIH TLV (United States, 3/2015).** TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes.
o-xylene	**NIOSH REL (United States, 10/2013).** STEL: 655 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. **OSHA PEL (United States, 2/2013).** TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 655 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **ACGIH TLV (United States, 3/2015).** TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours. STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes.
m-xylene	**NIOSH REL (United States, 10/2013).** STEL: 655 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. **OSHA PEL (United States, 2/2013).** TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 655 mg/m³ 15 minutes. STEL: 150 ppm 15 minutes. TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **ACGIH TLV (United States, 3/2015).** TWA: 100 ppm 8 hours. TWA: 434 mg/m³ 8 hours.

Section 8. Exposure controls/personal protection

mesitylene	STEL: 150 ppm 15 minutes. STEL: 651 mg/m³ 15 minutes. **ACGIH TLV (United States, 3/2015).** TWA: 25 ppm 8 hours. TWA: 123 mg/m³ 8 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 25 ppm 8 hours. TWA: 125 mg/m³ 8 hours. **NIOSH REL (United States, 10/2013).** TWA: 25 ppm 10 hours. TWA: 125 mg/m³ 10 hours.
ethylbenzene	**ACGIH TLV (United States, 3/2015).** TWA: 20 ppm 8 hours. **NIOSH REL (United States, 10/2013).** STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 10 hours. TWA: 100 ppm 10 hours. **OSHA PEL (United States, 2/2013).** TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 545 mg/m³ 15 minutes. STEL: 125 ppm 15 minutes. TWA: 435 mg/m³ 8 hours. TWA: 100 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Section 8. Exposure controls/personal protection

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid.

Color : Not available.

Boiling/condensation point : Lowest known value: 68.73°C (155.7°F) (n-hexane). Weighted average: 116.6°C (241.9°F)

Melting/freezing point : May start to solidify at the following temperature: 13.2°C (55.8°F) This is based on data for the following ingredient: p-xylene. Weighted average: -49.47°C (-57°F)

Critical temperature : Lowest known value: 234.25°C (453.6°F) (n-hexane).

Odor : Not available.

Odor threshold : Not available.

pH : Not available.

Flash point : Not available.

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : Highest known value: 4.1 (Air = 1) (mesitylene). Weighted average: 3.43 (Air = 1)

Gas Density (lb/ft ^{3}) : Weighted average: 0.81

Relative density : Not available.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : Not available.

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not available.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatibility with various substances : Extremely reactive or incompatible with the following materials: oxidizing materials. Highly reactive or incompatible with the following materials: acids.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
octane	LC50 Inhalation Gas.	Rat	25260 ppm	4 hours
	LC50 Inhalation Vapor	Rat	118 g/m³	4 hours
n-hexane	LC50 Inhalation Gas.	Rat	48000 ppm	4 hours
	LC50 Inhalation Vapor	Rat	96000 ppm	1 hours
	LD50 Oral	Rat	15840 mg/kg	-
benzene	LC50 Inhalation Gas.	Rat	10000 ppm	7 hours
	LD50 Oral	Rat	930 mg/kg	-
toluene	LC50 Inhalation Vapor	Rat	28830 ppm	1 hours
	LC50 Inhalation Vapor	Rat	49 g/m³	4 hours
p-xylene	LC50 Inhalation Gas.	Rat	9100 ppm	1 hours
	LC50 Inhalation Gas.	Rat	4550 ppm	4 hours
	LD50 Oral	Rat	3910 mg/kg	-
o-xylene	LC50 Inhalation Gas.	Mouse	8736 ppm	1 hours
	LC50 Inhalation Gas.	Rat	13400 ppm	1 hours
	LD50 Oral	Rat	3567 mg/kg	-
m-xylene	LD50 Oral	Rat	4988 mg/kg	-
propylbenzene	LC50 Inhalation Vapor	Rat	91910 ppm	1 hours
	LD50 Oral	Rat	6040 mg/kg	-
mesitylene	LC50 Inhalation Vapor	Rat	24000 mg/m³	4 hours
	LD50 Oral	Rat	5000 mg/kg	-
ethylbenzene	LD50 Dermal	Rabbit	>5000 mg/kg	-
	LD50 Oral	Rat	3500 mg/kg	-

Irritation/Corrosion

Section 11. Toxicological information

Product/ingredient name	Result	Species	Score	Exposure	Observation
n-hexane	Eyes - Mild irritant	Rabbit	-	10 milligrams	-
benzene	Eyes - Moderate irritant	Rabbit	-	88 milligrams	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Rat	-	8 hours 60 microliters	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
toluene	Eyes - Mild irritant	Rabbit	-	0.5 minutes 100 milligrams	-
	Eyes - Mild irritant	Rabbit	-	870 Micrograms	-
	Eyes - Severe irritant	Rabbit	-	24 hours 2 milligrams	-
	Skin - Mild irritant	Pig	-	24 hours 250 microliters	-
	Skin - Mild irritant	Rabbit	-	435 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Moderate irritant	Rabbit	-	500 milligrams	-
m-xylene	Eyes - Severe irritant	Rabbit	-	24 hours 5 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
	Skin - Severe irritant	Rabbit	-	24 hours 10 Micrograms	-
mesitylene	Eyes - Mild irritant	Rabbit	-	24 hours 500 milligrams	-
	Skin - Moderate irritant	Rabbit	-	24 hours 20 milligrams	-
ethylbenzene	Eyes - Severe irritant	Rabbit	-	500 milligrams	-
	Skin - Mild irritant	Rabbit	-	24 hours 15 milligrams	-

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Section 11. Toxicological information

Product/ingredient name	OSHA	IARC	NTP
toluene	-	3	-
benzene	+	1	Known to be a human carcinogen.
m-xylene	-	3	-
o-xylene	-	3	-
p-xylene	-	3	-
ethylbenzene	-	2B	-

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Name	Category	Route of exposure	Target organs
octane	Category 3	Not applicable.	Narcotic effects
n-hexane	Category 3	Not applicable.	Narcotic effects
toluene	Category 3	Not applicable.	Narcotic effects
propylbenzene	Category 3	Not applicable.	Respiratory tract irritation
mesitylene	Category 3	Not applicable.	Respiratory tract irritation

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
n-hexane	Category 2	Not determined	Not determined
benzene	Category 1	Not determined	bone marrow
toluene	Category 2	Not determined	Not determined

Aspiration hazard

Name	Result
octane	ASPIRATION HAZARD - Category 1
propylbenzene	ASPIRATION HAZARD - Category 1
ethylbenzene	ASPIRATION HAZARD - Category 1

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : Can cause central nervous system (CNS) depression. May cause drowsiness and dizziness.

Skin contact : Causes skin irritation.

Ingestion : Can cause central nervous system (CNS) depression.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:, pain or irritation, watering, redness

Inhalation : Adverse symptoms may include the following:, nausea or vomiting, headache, drowsiness/fatigue, dizziness/vertigo, unconsciousness, reduced fetal weight, increase in fetal deaths, skeletal malformations

Section 11. Toxicological information

Skin contact : Adverse symptoms may include the following:, irritation, redness, reduced fetal weight, increase in fetal deaths, skeletal malformations

Ingestion : Adverse symptoms may include the following:, reduced fetal weight, increase in fetal deaths, skeletal malformations

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : Causes damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : May cause genetic defects.

Teratogenicity : Suspected of damaging the unborn child.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : Suspected of damaging fertility.

Numerical measures of toxicity

Acute toxicity estimates

Route	ATE value
Oral	10387.8 mg/kg
Dermal	3422.2 mg/kg
Inhalation (gases)	25291.3 ppm
Inhalation (vapors)	77 mg/l

Section 12. Ecological information

Toxicity

Product/ingredient name	Result	Species	Exposure
n-hexane	Acute LC50 113000 µg/l Fresh water	Fish - Oreochromis mossambicus	96 hours
benzene	Acute EC50 29000 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1600000 µg/l Fresh water	Algae - Selenastrum sp.	96 hours
	Acute EC50 9230 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 21000 µg/l Marine water	Crustaceans - Artemia salina - Nauplii	48 hours
	Acute LC50 5.28 ul/L Fresh water	Fish - Oncorhynchus gorbuscha - Fry	96 hours
	Chronic NOEC 98 mg/l Fresh water	Daphnia - Daphnia magna	21 days
	Chronic NOEC 1.5 to 5.4 ul/L Marine	Fish - Morone saxatilis - Juvenile	4 weeks

Section 12. Ecological information

	water	(Fledgling, Hatchling, Weanling)	
toluene	Acute EC50 12500 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 11600 µg/l Fresh water	Crustaceans - Gammarus pseudolimnaeus - Adult	48 hours
	Acute EC50 6000 µg/l Fresh water	Daphnia - Daphnia magna - Juvenile (Fledgling, Hatchling, Weanling)	48 hours
	Acute LC50 5500 µg/l Fresh water	Fish - Oncorhynchus kisutch - Fry	96 hours
	Chronic NOEC 1000 µg/l Fresh water	Daphnia - Daphnia magna	21 days
p-xylene	Acute EC50 3200 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 4730 to 6310 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 2 ul/L Marine water	Fish - Morone saxatilis - Juvenile (Fledgling, Hatchling, Weanling)	96 hours
o-xylene	Acute EC50 4700 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 1390 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 38000 µg/l Marine water	Crustaceans - Cancer magister - Zoea	48 hours
	Acute LC50 7600 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
m-xylene	Acute EC50 4900 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 5770 to 7640 µg/l Fresh water	Crustaceans - Artemia sp. - Nauplii	48 hours
	Acute LC50 23600 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 8400 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
propylbenzene	Acute EC50 1800 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute LC50 1550 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours
mesitylene	Acute LC50 13000 µg/l Marine water	Crustaceans - Cancer magister - Zoea	48 hours
	Acute LC50 12520 µg/l Fresh water	Fish - Carassius auratus	96 hours
	Chronic NOEC 400 µg/l Fresh water	Daphnia - Daphnia magna	21 days
ethylbenzene	Acute EC50 4600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	72 hours
	Acute EC50 3600 µg/l Fresh water	Algae - Pseudokirchneriella subcapitata	96 hours
	Acute EC50 2930 to 4400 µg/l Fresh water	Daphnia - Daphnia magna - Neonate	48 hours
	Acute LC50 40000 µg/l Marine water	Crustaceans - Cancer magister - Zoea	48 hours
	Acute LC50 4200 µg/l Fresh water	Fish - Oncorhynchus mykiss	96 hours

Persistence and degradability

Not available.

Bioaccumulative potential

Section 12. Ecological information

Product/ingredient name	$LogP_{ow}$	BCF	Potential
octane	5.18	198.7	low
n-hexane	4	501.187	high
benzene	2.13	11	low
toluene	2.73	90	low
p-xylene	3.15	8.1 to 25.9	low
o-xylene	3.12	8.1 to 25.9	low
m-xylene	3.2	8.1 to 25.9	low
propylbenzene	3.69	-	low
mesitylene	3.42	161	low
ethylbenzene	3.6	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

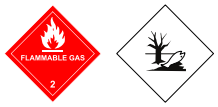
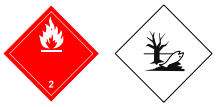
United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Benzene (I,T)	71-43-2	Listed	U019
Toluene; Benzene, methyl-	108-88-3	Listed	U220
Xylene	108-38-3	Listed	U239
Xylene	95-47-6	Listed	U239
Xylene	106-42-3	Listed	U239

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN3161	UN3161	UN3161	UN3161	UN3161
UN proper shipping name	Liquefied gas, flammable n.o.s. (Toluene, Hexane)	Liquefied gas, flammable n.o.s. (Toluene, Hexane)	Liquefied gas, flammable n.o.s. (Toluene, Hexane)	Liquefied gas, flammable n.o.s. (Toluene, Hexane)	Liquefied gas, flammable n.o.s. (Toluene, Hexane)

Section 14. Transport information

Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	Yes.	No.
Additional information	This product is not regulated as a marine pollutant when transported on inland waterways in sizes of ≤5 L or ≤5 kg or by road, rail, or inland air in non-bulk sizes, provided the packagings meet the general provisions of §§ 173.24 and 173.24a. **Reportable quantity** 50 lbs / 22.7 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2), 2.7 (Marine pollutant mark). The marine pollutant mark is not required when transported by road or rail. **Explosive Limit and Limited Quantity Index** 0.125 **ERAP Index** 3000 **Passenger Carrying Ship Index** Forbidden **Passenger Carrying Road or Rail Index** Forbidden	-	The marine pollutant mark is not required when transported in sizes of ≤5 L or ≤5 kg.	The environmentally hazardous substance mark may appear if required by other transportation regulations.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations :
TSCA 8(a) PAIR: p-xylene
TSCA 8(a) CDR Exempt/Partial exemption: Not determined
United States inventory (TSCA 8b): All components are listed or exempted.
Clean Water Act (CWA) 307: benzene; toluene; ethylbenzene
Clean Water Act (CWA) 311: benzene; toluene; m-xylene; o-xylene; p-xylene; ethylbenzene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Section 15. Regulatory information

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
octane	10 - 20	Yes.	No.	No.	Yes.	No.
n-hexane	10 - 20	Yes.	No.	No.	Yes.	Yes.
benzene	10 - 20	Yes.	No.	No.	Yes.	Yes.
toluene	10 - 20	Yes.	No.	No.	Yes.	Yes.
p-xylene	8 - 15	Yes.	No.	No.	Yes.	No.
o-xylene	8 - 15	Yes.	No.	No.	Yes.	No.
m-xylene	8 - 15	Yes.	No.	No.	Yes.	No.
propylbenzene	1 - 5	Yes.	No.	No.	Yes.	No.
mesitylene	1 - 5	Yes.	No.	No.	Yes.	No.
ethylbenzene	1 - 5	Yes.	No.	No.	Yes.	No.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	toluene benzene n-hexane m-xylene o-xylene p-xylene ethylbenzene	108-88-3 71-43-2 110-54-3 108-38-3 95-47-6 106-42-3 100-41-4	10 - 20 10 - 20 10 - 20 8 - 15 8 - 15 8 - 15 1 - 5
Supplier notification	toluene benzene n-hexane m-xylene o-xylene p-xylene ethylbenzene	108-88-3 71-43-2 110-54-3 108-38-3 95-47-6 106-42-3 100-41-4	10 - 20 10 - 20 10 - 20 8 - 15 8 - 15 8 - 15 1 - 5

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Section 15. Regulatory information

Massachusetts : The following components are listed: OCTANE; HEXANE; BENZENE; TOLUENE; M-XYLENE; O-XYLENE; P-XYLENE; ETHYL BENZENE; mesitylene; PROPYLBENZENE

New York : The following components are listed: Hexane; Benzene; Toluene; m-Xylene; o-Xylene; p-Xylene; Ethylbenzene

New Jersey : The following components are listed: OCTANE; n-HEXANE; HEXANE; BENZENE; TOLUENE; BENZENE, METHYL-; m-XYLENE; BENZENE, 1,3-DIMETHYL-; o-XYLENE; BENZENE, 1,2-DIMETHYL-; p-XYLENE; BENZENE, 1,4-DIMETHYL-; ETHYL BENZENE; BENZENE, ETHYL-; mesitylene; PROPYL BENZENE; BENZENE, PROPYL-

Pennsylvania : The following components are listed: OCTANE; HEXANE; BENZENE; BENZENE, METHYL-; BENZENE, 1,3-DIMETHYL-; BENZENE, 1,2-DIMETHYL-; BENZENE, 1, 4-DIMETHYL-; BENZENE, ETHYL-; mesitylene; BENZENE, PROPYL-

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
toluene	No.	Yes.	No.	7000 µg/day (ingestion)
benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)
ethylbenzene	Yes.	No.	41 µg/day (ingestion) 54 µg/day (inhalation)	No.

Canada inventory : All components are listed or exempted.

International regulations

International lists : **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): All components are listed or exempted.

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Canada

Section 15. Regulatory information

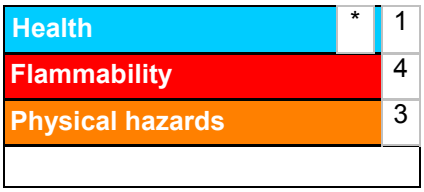
WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

CEPA Toxic substances: The following components are listed: Benzene
Canadian ARET: None of the components are listed.
Canadian NPRI: The following components are listed: Octane (all isomers); n-Hexane; Benzene; Toluene; Xylene (all isomers); Xylene (all isomers); Xylene (all isomers); Ethylbenzene; Trimethylbenzene
Alberta Designated Substances: None of the components are listed.
Ontario Designated Substances: None of the components are listed.
Quebec Designated Substances: None of the components are listed.

Section 16. Other information

Canada Label requirements : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 3/16/2016

Date of issue/Date of revision : 3/16/2016

Date of previous issue : No previous validation

Version : 1

Section 16. Other information

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Version 4.7
Revision Date 06/18/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,3-Dichlorobenzene

Product Number : 113808
Brand : Aldrich
Index-No. : 602-067-00-7

CAS-No. : 541-73-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H227 Combustible liquid.
H302 Harmful if swallowed.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you

	feel unwell. Rinse mouth.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_6H_4Cl_2$
Molecular weight	:	147.00 g/mol
CAS-No.	:	541-73-1
EC-No.	:	208-792-1
Index-No.	:	602-067-00-7

Hazardous components

Component	Classification	Concentration
1,3-Dichlorobenzene		
	Flam. Liq. 4; Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H227, H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Combustible liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm

Break through time: 37 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -25 - -22 °C (-13 - -8 °F) - lit.
f)	Initial boiling point and boiling range	172 - 173 °C (342 - 343 °F) - lit.
g)	Flash point	67.0 °C (152.6 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.288 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Mouse - 1,062 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (1,3-Dichlorobenzene)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CZ4499000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 7.8 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 1.7 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: Pimephales promelas (fathead minnow) - 32 d - 0.3 mg/l

Bioconcentration factor (BCF): 97

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (1,3-Dichlorobenzene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (1,3-Dichlorobenzene)
Marine pollutant:yes

IATA
UN number: 3082 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (1,3-Dichlorobenzene)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,3-Dichlorobenzene	541-73-1	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H302	Harmful if swallowed.
H401	Toxic to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	2
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7 Revision Date: 06/18/2015 Print Date: 02/09/2016

SAFETY DATA SHEET

Version 4.4
Revision Date 04/24/2015
Print Date 04/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,4-Dichlorobenzene

Product Number : D56829
Brand : Aldrich
Index-No. : 602-035-00-2

CAS-No. : 106-46-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H319 Causes serious eye irritation.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P273 Avoid release to the environment.
P280 Wear protective gloves/ eye protection/ face protection.

P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_6H_4Cl_2$
Molecular weight	:	147.00 g/mol
CAS-No.	:	106-46-7
EC-No.	:	203-400-5
Index-No.	:	602-035-00-2

Hazardous components

Component	Classification	Concentration
1,4-Dichlorobenzene		
	Eye Irrit. 2A; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H319, H351, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,4-Dichlorobenzene	106-46-7	TWA	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye irritation Kidney damage Confirmed animal carcinogen with unknown relevance to humans		
		Potential Occupational Carcinogen See Appendix A		
		TWA	75.000000 ppm 450.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: sheets Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 52 - 54 °C (126 - 129 °F) - lit.
f)	Initial boiling point and boiling range	173 °C (343 °F) - lit.
g)	Flash point	66.0 °C (150.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	8.8 hPa (6.6 mmHg) at 50.0 °C (122.0 °F) 0.5 hPa (0.4 mmHg) at 25.0 °C (77.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.241 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available

o)	Partition coefficient: n-octanol/water	log Pow: 3.40
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Bulk density	650 kg/m3

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD0 Oral - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 401)

LC50 Inhalation - Rat - male and female - 4 h - > 5.07 mg/l

LD0 Dermal - Rat - > 2,000 mg/kg
(OECD Test Guideline 402)

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Did not cause sensitisation on laboratory animals.
(OECD Test Guideline 406)

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (1,4-Dichlorobenzene)
NTP:	Reasonably anticipated to be a human carcinogen (1,4-Dichlorobenzene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CZ4550000

Produces:, methemoglobin, Nausea, Vomiting, Increased pulse rate, Headache, Impairment of vision

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Salmo gairdneri - 1.12 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 0.7 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - Scenedesmus capricornutum (fresh water algae) - 1.6 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 30 % - Not rapidly biodegradable (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation	Jordanella floridae - 5 d - 2.68 µg/l Bioconcentration factor (BCF): 296

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (1,4-Dichlorobenzene)
Reportable Quantity (RQ): 100 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (1,4-Dichlorobenzene)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (1,4-Dichlorobenzene)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
1,4-Dichlorobenzene	106-46-7	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H319	Causes serious eye irritation.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.4 Revision Date: 04/24/2015 Print Date: 04/01/2016

SAFETY DATA SHEET

Version 5.4
Revision Date 03/03/2015
Print Date 04/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 1,4-Dioxane

Product Number : 296309
Brand : Sigma-Aldrich
Index-No. : 603-024-00-5

CAS-No. : 123-91-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.

P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides., Repeated exposure may cause skin dryness or cracking.
May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Dioxane Diethylene oxide
Formula	:	$C_4H_8O_2$
Molecular weight	:	88.11 g/mol
CAS-No.	:	123-91-1
EC-No.	:	204-661-8
Index-No.	:	603-024-00-5
Registration number	:	01-2119462837-26-XXXX

Hazardous components

Component	Classification	Concentration
1,4-Dioxane		
	Flam. Liq. 2; Eye Irrit. 2A; Carc. 2; STOT SE 3; H225, H319, H335, H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
1,4-Dioxane	123-91-1	TWA	20.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	20 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	25 ppm 90 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	100.000000 ppm 360.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		
		TWA	100 ppm 360 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		
		C	1.000000 ppm 3.600000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A 30 minute ceiling value		

Derived No Effect Level (DNEL)

Application Area	Exposure routes	Health effect	Value
Workers	Inhalation	Long-term local effects	144 mg/m3
Workers	Inhalation	Long-term systemic effects	73 mg/m3
Workers	Skin contact	Long-term systemic effects	21 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	0.153 mg/kg
Marine water	0.67 mg/l
Fresh water	10 mg/l
Fresh water sediment	37 mg/kg
Sewage treatment plant	2700 mg/l
Aquatic intermittent release	10 mg/l

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 35 min
Material tested:Camapren® (KCL 722 / Aldrich Z677493, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	6.0 - 8 at 500 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/range: 10 - 12 °C (50 - 54 °F) - lit.
f)	Initial boiling point and boiling range	100 - 102 °C (212 - 216 °F) - lit.
g)	Flash point	12 °C (54 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 22 %(V) Lower explosion limit: 2 %(V)
k)	Vapour pressure	36 hPa (27 mmHg) at 20 °C (68 °F) 53 hPa (40 mmHg) at 25.20 °C (77.36 °F)
l)	Vapour density	3.04 - (Air = 1.0)

m)	Relative density	1.034 g/cm3 at 25 °C (77 °F)
n)	Water solubility	completely miscible
o)	Partition coefficient: n-octanol/water	log Pow: -0.27
p)	Auto-ignition temperature	300 °C (572 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	36.9 mN/m at 25 °C (77 °F)
Relative vapour density	3.04 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxygen, Oxidizing agents, Halogens, Reducing agents, Perchlorates., Trimethylaluminum

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4,200 mg/kg

LC50 Inhalation - Rat - 2 h - 46,000 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Other.

LD50 Dermal - Rabbit - 7,858 mg/kg

No data available

Skin corrosion/irritation
Skin - Human
Remarks: Chronic exposure causes drying effect on the skin and eczema.

Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (1,4-Dioxane)
NTP:	Reasonably anticipated to be a human carcinogen (1,4-Dioxane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: JG8225000

Nausea, Vomiting, Weakness, Dizziness, Vertigo, Headache, Sweating, loss of appetite, Kidney injury may occur., Liver injury may occur.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 985 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 8,450 mg/l - 24 h
Toxicity to algae	EC50 - Desmodesmus subspicatus (green algae) - > 500 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability	Result: < 5 % - Not readily biodegradable.

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1165 Class: 3 Packing group: II
Proper shipping name: Dioxane
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1165 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: DIOXANE

IATA
UN number: 1165 Class: 3 Packing group: II
Proper shipping name: Dioxane

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
1,4-Dioxane	123-91-1	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 03/03/2015 Print Date: 04/11/2016

SAFETY DATA SHEET

Creation Date 13-Apr-2009 **Revision Date** 24-Dec-2021 **Revision Number** 7

1. Identification

Product Name **2-Butanone**

Cat No. : **AC149670000; AC149670010; AC149670025; AC149670051; AC149670250; AC149670251**

CAS No 78-93-3
Synonyms Methyl ethyl ketone; MEK; Ethyl methyl ketone

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Kidney, Liver.	

Label Elements

Signal Word
Danger

Hazard Statements

Highly flammable liquid and vapor
Causes serious eye irritation
May cause drowsiness or dizziness
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Wear protective gloves/protective clothing/eye protection/face protection
Keep cool
Response
Get medical attention/advice if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Repeated exposure may cause skin dryness or cracking
Other hazards
Contains a known or suspected endocrine disruptor.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Methyl ethyl ketone	78-93-3	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get

	medical attention.
Skin Contact	Wash off immediately with plenty of water for at least 15 minutes. Get medical attention if symptoms occur.
Inhalation	Remove to fresh air. Get medical attention if symptoms occur. If not breathing, give artificial respiration.
Ingestion	Do NOT induce vomiting. Get medical attention.
Most important symptoms and effects	Difficulty in breathing. Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Notes to Physician	Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media	CO_2, dry chemical, dry sand, alcohol-resistant foam. Water mist may be used to cool closed containers.
Unsuitable Extinguishing Media	Water may be ineffective
Flash Point	-7 °C / 19.4 °F
Method -	CC (closed cup)
Autoignition Temperature	404 °C / 759.2 °F
Explosion Limits	
Upper	11.4 vol %
Lower	1.4 vol %
Oxidizing Properties	Not oxidising
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated. Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	1	N/A

6. Accidental release measures

Personal Precautions	Use personal protective equipment as required. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes or clothing. Ensure adequate ventilation.
Environmental Precautions	Avoid release to the environment. See Section 12 for additional Ecological Information.
Methods for Containment and Clean Up	Remove all sources of ignition. Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Use spark-proof tools and explosion-proof equipment.

7. Handling and storage

Handling

Wear personal protective equipment/face protection. Ensure adequate ventilation. Use spark-proof tools and explosion-proof equipment. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharges. Use only non-sparking tools. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage.

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat, sparks and flame. Flammables area. Incompatible Materials. Strong oxidizing agents. Strong acids. Strong bases. Strong reducing agents. Ammonia. copper. Amines.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Methyl ethyl ketone	TWA: 200 ppm STEL: 300 ppm	(Vacated) TWA: 200 ppm (Vacated) TWA: 590 mg/m³ (Vacated) STEL: 300 ppm (Vacated) STEL: 885 mg/m³ TWA: 200 ppm TWA: 590 mg/m³	IDLH: 3000 ppm TWA: 200 ppm TWA: 590 mg/m³ STEL: 300 ppm STEL: 885 mg/m³	TWA: 200 ppm STEL: 300 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Ensure adequate ventilation, especially in confined areas. Use explosion-proof electrical/ventilating/lighting equipment. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Characteristic - sweet
Odor Threshold	No information available
pH	No information available
Melting Point/Range	-87 °C / -124.6 °F
Boiling Point/Range	80 °C / 176 °F
Flash Point	-7 °C / 19.4 °F
Method -	CC (closed cup)

Evaporation Rate	3.7
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	11.4 vol %
Lower	1.4 vol %
Vapor Pressure	105 mbar @ 20 °C
Vapor Density	2.41
Specific Gravity	0.806
Solubility	Soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	404 °C / 759.2 °F
Decomposition Temperature	No information available
Viscosity	0.42 mPa.s @ 15°C
Molecular Formula	C4 H8 O
Molecular Weight	72.11

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Hygroscopic.

Conditions to Avoid Incompatible products. Excess heat. Keep away from open flames, hot surfaces and sources of ignition. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents, Strong acids, Strong bases, Strong reducing agents, Ammonia, copper, Amines

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Methyl ethyl ketone	LD50 = 2483 mg/kg (Rat)	LD50 = 5000 mg/kg (Rabbit)	LC50 = 11700 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Methyl ethyl ketone	78-93-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Kidney Liver

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting: Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methyl ethyl ketone	Not listed	Lepomis macrochirus: LC50=3,22 g/L 96 h	EC50 = 3403 mg/L 30 min EC50 = 3426 mg/L 5 min	EC50: = 5091 mg/L, 48h (Daphnia magna) EC50: 4025 - 6440 mg/L, 48h Static (Daphnia magna) EC50: > 520 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Methyl ethyl ketone	0.29

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Methyl ethyl ketone - 78-93-3	U159	-

14. Transport information

DOT

UN-No UN1193
Proper Shipping Name Ethyl methyl ketone
Hazard Class 3
Packing Group II

TDG

UN-No UN1193
Proper Shipping Name ETHYL METHYL KETONE
Hazard Class 3
Packing Group II

IATA

UN-No UN1193
Proper Shipping Name Methyl ethyl ketone
Hazard Class 3

Packing Group II

IMDG/IMO

UN-No UN1193
Proper Shipping Name Ethyl methyl ketone (Methyl ethyl ketone)
Hazard Class 3
Packing Group II

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Methyl ethyl ketone	78-93-3	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Methyl ethyl ketone	78-93-3	X	-	201-159-0	X	X	X	X	X	KE-24094

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Methyl ethyl ketone	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methyl ethyl ketone	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Methyl ethyl ketone	-	Use restricted. See item 75. (see link for restriction details)	-

https://echa.europa.eu/substances-restricted-under-reach

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Methyl ethyl ketone	78-93-3	Listed	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Methyl ethyl ketone	78-93-3	Not applicable	Not applicable	Not applicable	Annex I - Y42

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 13-Apr-2009
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **2-Methylnaphthalene, 99% (gc)**

Cat No. : **AC414551000; AC414555000**

Synonyms No information available

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation



Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear protective gloves/protective clothing/eye protection/face protection
Avoid breathing dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
2-Methylnaphthalene	91-57-6	99.0

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes.

Inhalation Move to fresh air.

Ingestion Do not induce vomiting.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
None known
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up No information available.

7. Handling and storage

Handling Ensure adequate ventilation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
2-Methylnaphthalene	TWA: 0.5 ppm Skin		

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
2-Methylnaphthalene			TWA: 0.5 ppm Skin

Legend

ACGIH - American Conference of Governmental Industrial Hygienists

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	No information available
Odor	Odorless
Odor Threshold	No information available
pH	
Melting Point/Range	37 38 °C
Boiling Point/Range	°C
Flash Point	
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	< 1 mmHg @ 25 °C
Vapor Density	No information available
Relative Density	1.0000
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C11H10
Molecular Weight	142.20

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
2-Methylnaphthalene	1630 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
2-Methylnaphthalene	91-57-6	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
2-Methylnaphthalene	Not listed	Pimephales promelas:LC50 = 2.5mg/L	Not listed	EC50 = 1.5 mg/L/48h

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

Component	log Pow
2-Methylnaphthalene	3.86

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
2-Methylnaphthalene	X	X	-	202-078-3	-		X	X	X	X	-

Legend:

X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
2-Methylnaphthalene	-	X	-	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials

D2B Toxic materials



16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

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End of SDS

SAFETY DATA SHEET

Version 5.1
Revision Date 06/26/2014
Print Date 05/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : 4,4′-DDD

Product Number : 35486
Brand : Sigma-Aldrich

CAS-No. : 72-54-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P322	Specific measures (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,1-Dichloro-2,2-bis(4-chlorophenyl)ethane TDE
Formula	:	$C_{14}H_{10}Cl_4$
Molecular Weight	:	320.04 g/mol
CAS-No.	:	72-54-8
EC-No.	:	200-783-0

Hazardous components

Component	Classification	Concentration
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312, H351, H410	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas
Nature of decomposition products not known.

5.3 Advice for firefighters

Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information

no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	94.0 - 96.0 °C (201.2 - 204.8 °F)
f)	Initial boiling point and boiling range	193.0 °C (379.4 °F) at 1.3 hPa (1.0 mmHg)
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	< 0.00001 hPa (< 0.00001 mmHg) at 25.0 °C (77.0 °F)
l)	Vapour density	no data available
m)	Relative density	1.38 g/cm3
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	log Pow: 6.02
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Hamster - > 5,000 mg/kg

TDLo Oral - Human - 428.5 mg/kg
Remarks: Endocrine:Adrenal cortex hypoplasia.

TDLo Oral - rat - 6,000 mg/kg
Remarks: Cardiac:Other changes. Gastrointestinal:Other changes. Kidney, Ureter, Bladder:Changes in both tubules and glomeruli.

TDLo Oral - rat - 14 mg/kg
Remarks: Liver:Changes in liver weight. Endocrine:Estrogenic. Musculoskeletal:Other changes.

TDLo Oral - rat - 2,100 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex).

Inhalation: no data available

LD50 Dermal - rabbit - 1,200 mg/kg
Remarks: Behavioral:Excitement. Behavioral:Convulsions or effect on seizure threshold. Skin irritation

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: KI0700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 1.18 - 9 mg/l - 96.0 h
	LC50 - Lepomis macrochirus (Bluegill) - 0.04 - 0.05 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.06 - 0.09 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 3.47 - 5.58 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia pulex (Water flea) - 0.01 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
Indication of bioaccumulation.

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)
Marine pollutant: No

IATA
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane)

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
2,2-bis(4-Chlorophenyl)-1,1-dichloro-ethane	72-54-8	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1 Revision Date: 06/26/2014 Print Date: 05/11/2016

SAFETY DATA SHEET

Version 6.7
Revision Date 08/05/2024
Print Date 08/06/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : *p*-Cymene

Product Number : W235601
Brand : Aldrich
Index-No. : 601-094-00-1
CAS-No. : 99-87-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 3), H331
Reproductive toxicity (Category 2), H361

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Aspiration hazard (Category 1), H304
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Danger

Hazard Statements

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H331	Toxic if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P331	Do NOT induce vomiting.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

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SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 1-Isopropyl-4-methylbenzene
4-Isopropyltoluene

Formula : $C_{10}H_{14}$
Molecular weight : 134.22 g/mol
CAS-No. : 99-87-6
EC-No. : 202-796-7
Index-No. : 601-094-00-1

Component	Classification	Concentration
p-Cymene		
	Flam. Liq. 3; Acute Tox. 3; Repr. 2; Asp. Tox. 1; Aquatic Acute 2; Aquatic Chronic 2; H226, H331, H361, H304, H401, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

No data available

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

No data available

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.

5.3 Advice for firefighters

No data available

5.4 Further information

No data available

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
For personal protection see section 8.

6.2 Environmental precautions
No data available

6.3 Methods and materials for containment and cleaning up
No data available

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
No data available

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls
No data available

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/freezing point: < -20 °C (< -4 °F) - OECD Test Guideline 102
f)	Initial boiling point	176 - 178 °C 349 - 352 °F - lit.

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	and boiling range	
g)	Flash point	52 °C (126 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 5.6 %(V) Lower explosion limit: 0.7 %(V)
k)	Vapor pressure	3.6 hPa at 25 °C (77 °F) - OECD Test Guideline 104
l)	Vapor density	No data available
m)	Density	0.86 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	0.015 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	log Pow: 4.8 at ca.20 °C (ca.68 °F) - OECD Test Guideline 117
p)	Autoignition temperature	> 400 °C (> 752 °F) at 994 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Solubility in other solvents	Alcohol - soluble

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

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10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 4,750 mg/kg
Acute toxicity estimate Inhalation - 4 h - 3 mg/l - vapor

(Expert judgment)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)
LD50 Dermal - Rabbit - > 5,000 mg/kg
Remarks: (ECHA)
No data available

Skin corrosion/irritation
Remarks: No data available
Skin - reconstructed human epidermis (RhE)
Result: No skin irritation
(OECD Test Guideline 439)

Serious eye damage/eye irritation
Eyes - Humans
Result: No eye irritation
(OECD Test Guideline 492)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: negative
(OECD Test Guideline 429)

Germ cell mutagenicity
Test Type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster fibroblasts
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

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OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Suspected of damaging fertility.

Developmental Toxicity- Rat- male and female- Oral

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

11.2 Additional Information

Repeated dose toxicity - Rat - male - Oral - NOAEL (No observed adverse effect level) - 50 mg/kg

Repeated dose toxicity - Rat - male - Inhalation
Remarks: (ECHA)

RTECS: GZ5950000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Cyprinodon variegatus (sheepshead minnow) - 48 mg/l - 96 h (OPPTS 850.1075)
Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Daphnia magna (Water flea) - 3.7 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test EC50 - Scenedesmus capricornutum (fresh water algae) - 4.03 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test NOEC - activated sludge - 100 mg/l - 28 d

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 14 d Result: 88 % - Readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

No data available

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12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods
No data available

SECTION 14: Transport information

DOT (US)
UN number: 2046 Class: 3 Packing group: III
Proper shipping name: Cymenes
Reportable Quantity (RQ):
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG
UN number: 2046 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: CYMENES
Marine pollutant : yes
Marine pollutant : yes

IATA
UN number: 2046 Class: 3 Packing group: III
Proper shipping name: Cymenes

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

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SARA 311/312 Hazards	:	Fire Hazard Acute Health Hazard
SARA 313	:	This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

p-Cymene	99-87-6

Pennsylvania Right To Know

p-Cymene	99-87-6

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA	:	All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.7 Revision Date: 08/05/2024 Print Date: 08/06/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 5.4
Revision Date 01/02/2015
Print Date 12/11/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Acenaphthene

Product Number : 215376
Brand : Aldrich

CAS-No. : 83-32-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,8-Ethylenenaphthalene

Formula : $C_{12}H_{10}$

Molecular weight : 154.21 g/mol

CAS-No. : 83-32-9

EC-No. : 201-469-6

Hazardous components

Component	Classification	Concentration
Acenaphthene		
	Skin Irrit. 2; Eye Irrit. 2A; Carc. 1B; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 90 - 94 °C (194 - 201 °F) - lit.
f)	Initial boiling point and boiling range	279 °C (534 °F) - lit.
g)	Flash point	125.0 °C (257.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available

k)	Vapour pressure	13.3 hPa (10.0 mmHg) at 131.0 °C (267.8 °F)
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.39 - 4.19
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Rat - 600 mg/kg

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Acenaphthene)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen (Acenaphthene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: AB1000000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.67 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 0.6 - 1.73 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 1.27 - 3.45 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 0.52 - 0.53 mg/l - 96 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 28 d - 0.00894 mg/l
	Bioconcentration factor (BCF): 387

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Acenaphthene)
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Acenaphthene)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Acenaphthene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Acenaphthene	83-32-9	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Acenaphthene	83-32-9	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 01/02/2015 Print Date: 12/11/2015

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Poly(acenaphthylene)**

Cat No. : **AC178020000; AC178020050; AC178020100**

Synonyms None.

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Based on available data, the classification criteria are not met

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

Unknown Acute Toxicity
.? % of the mixture consists of ingredients of unknown toxicity.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Poly(acenaphthylene)	25036-01-5	100

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated

clothes and shoes.

Inhalation Remove from exposure, lie down. Move to fresh air.

Ingestion Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. If possible drink milk afterwards.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Thermal decomposition can lead to release of irritating gases and vapors Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling Avoid contact with skin and eyes. Avoid contact with clothing. Remove and wash contaminated clothing before re-use. Avoid breathing vapors or mists. Do not ingest. Wash thoroughly after handling.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ventilation systems.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Wear a NIOSH/MSHA or European Standard EN 149 approved full-facepiece airline respirator in the positive pressure mode with emergency escape provisions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	No data available
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Oxidizing agents

Hazardous Decomposition Products Thermal decomposition can lead to release of irritating gases and vapors, Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Oral LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Dermal LD50 Based on ATE data, the classification criteria are not met. ATE > 2000 mg/kg.
Mist LC50 Based on ATE data, the classification criteria are not met. ATE > 5 mg/l.
Component Information
Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Poly(acenaphthylene)	25036-01-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know Not applicable

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.11
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Acetone

Product Number : 179124
Brand : SIGALD
Index-No. : 606-001-00-8
CAS-No. : 67-64-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336

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operates as MilliporeSigma in the US and Canada

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word: Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Repeated exposure may cause skin dryness or cracking.

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C_3H_6O
Molecular weight	:	58.08 g/mol
CAS-No.	:	67-64-1
EC-No.	:	200-662-2
Index-No.	:	606-001-00-8

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Component	Classification	Concentration
acetone		
	Flam. Liq. 2; Eye Irrit. 2A; STOT SE 3; H225, H319, H336 Concentration limits: >= 20 %: STOT SE 3, H336;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

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5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®).
Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

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Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
acetone	67-64-1	TWA	250 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		
		STEL	500 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Not classifiable as a human carcinogen		
		TWA	250 ppm 590 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1,000 ppm 2,400 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		C	3,000 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		PEL	500 ppm 1,200 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	750 ppm 1,780 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
acetone	67-64-1	Acetone	25 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

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Derived No Effect Level (DNEL)

Application Area	Routes of exposure	Health effect	Value
Workers	Skin contact	Long-term systemic effects	186mg/kg BW/d
Consumers	Ingestion	Long-term systemic effects	62mg/kg BW/d
Consumers	Skin contact	Long-term systemic effects	62mg/kg BW/d
Workers	Inhalation	Acute systemic effects	2420 mg/m3
Workers	Inhalation	Long-term systemic effects	1210 mg/m3
Consumers	Inhalation	Long-term systemic effects	200 mg/m3

Predicted No Effect Concentration (PNEC)

Compartment	Value
Soil	33.3 mg/kg
Sea water	1.06 mg/l
Fresh water	10.6 mg/l
Sea sediment	3.04 mg/kg
Fresh water sediment	30.4 mg/kg
Onsite sewage treatment plant	100 mg/l

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Butoject® (KCL 898)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Latex gloves
Minimum layer thickness: 0.6 mm
Break through time: 10 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

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Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type AX
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: clear, liquid Color: colorless
b)	Odor	pungent, weakly aromatic
c)	Odor Threshold	0.1 ppm
d)	pH	5 - 6 at 395 g/l at 20 °C (68 °F)
e)	Melting point/freezing point	Melting point/ range: -94 °C (-137 °F) - lit.
f)	Initial boiling point and boiling range	56 °C 133 °F at 1,013 hPa - lit.
g)	Flash point	-17.0 °C (1.4 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 13 %(V) Lower explosion limit: 2 %(V)
k)	Vapor pressure	245.3 hPa at 20.0 °C (68.0 °F)
l)	Vapor density	No data available
m)	Density	0.791 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	soluble, in all proportions
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition	465.0 °C (869.0 °F)

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	temperature	
q)	Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Conductivity	0.01 µS/cm at 20 °C (68 °F)
Surface tension	23.2 mN/m at 20.0 °C (68.0 °F)

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapors may form explosive mixture with air.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Risk of ignition or formation of inflammable gases or vapours with:
chromosulfuric acid
chromyl chloride
ethanolamine
Fluorine
Strong oxidizing agents
strong reducing agents
Nitric acid
chromium(VI) oxide
Risk of explosion with:
nonmetallic oxyhalides
halogen-halogen compounds
Chloroform
nitrating acid
nitrosyl compounds
hydrogen peroxide
halogen oxides
organic nitro compounds
peroxi compounds
Exothermic reaction with:
Bromine
Alkali metals
alkali hydroxides
Halogenated hydrocarbon
Sulfur dichloride
phosphorous oxichloride

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10.4 Conditions to avoid
Warming.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - 5,800 mg/kg
Remarks: (ECHA)
Symptoms: Stomach/intestinal disorders, Risk of aspiration upon vomiting., Pulmonary failure possible after aspiration of vomit.
LC50 Inhalation - Rat - 4 h - 76 mg/l - vapor

Remarks: Unconsciousness
Drowsiness
Dizziness
(External MSDS)
LD50 Dermal - Rabbit - 20,000 mg/kg
Remarks: (IUCLID)

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h
(Draize Test)
Remarks: (RTECS)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h
(Draize Test)
Remarks: (RTECS)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
Remarks: (ECHA)
Chronic exposure may cause dermatitis.

Germ cell mutagenicity
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation

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Method: OECD Test Guideline 471
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause drowsiness or dizziness. - Narcotic effects
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: AL3150000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

Headache
Salivation
Nausea
Vomiting
Dizziness
narcosis
Coma

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

Kidney - Irregularities - Based on Human Evidence

Skin - Dermatitis - Based on Human Evidence

Kidney - Irregularities - Based on Human Evidence

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Skin - Dermatitis - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 6,210 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test LC50 - Daphnia pulex (Water flea) - 8,800 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test NOEC - M.aeruginosa - 530 mg/l - 8 d (DIN 38412) Remarks: (maximum permissible toxic concentration) (IUCLID)
Toxicity to bacteria	static test EC50 - activated sludge - 61.15 mg/l - 30 min (OECD Test Guideline 209)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	flow-through test NOEC - Daphnia magna (Water flea) - 2,212 mg/l - 28 d Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 91 % - Readily biodegradable. (OECD Test Guideline 301B)
Biochemical Oxygen Demand (BOD)	1,850 mg/g Remarks: (IUCLID)
Chemical Oxygen Demand (COD)	2,070 mg/g Remarks: (IUCLID)
Theoretical oxygen demand	2,200 mg/g Remarks: (Lit.)

12.3 Bioaccumulative potential

Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

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12.7 Other adverse effects

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone
Reportable Quantity (RQ): 5000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1090 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: ACETONE

IATA
UN number: 1090 Class: 3 Packing group: II
Proper shipping name: Acetone

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
acetone	67-64-1	5000	5000

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

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SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

acetone	67-64-1

Pennsylvania Right To Know

acetone	67-64-1

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.11 Revision Date: 09/06/2024 Print Date: 09/07/2024

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Safety Data Sheet

Revision Date: 10/21/14
www.restek.com

1. IDENTIFICATION

Catalog Number / Product Name:	**32205, 32205-5XX, & 32305 / Aldrin Standard**
Company:	Restek Corporation
Address:	110 Benner Circle Bellefonte, Pa. 16823
Phone#:	814-353-1300
Fax#:	814-353-1309
Emergency#:	800-424-9300 (CHEMTREC) 703-527-3887 (Outside the US)
Email:	sds@restek.com
Revision Number:	5
Intended use:	For Laboratory use only

2. HAZARD(S)IDENTIFICATION

Emergency Overview:

GHS Hazard Symbols:



GHS Classification:

Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 1
Flammable Liquid Category 2
Acute Toxicity - Inhalation Dust / Mist Category 3
Acute Toxicity - Inhalation Vapour Category 3
Acute Toxicity - Inhalation Gas Category 3
Acute Toxicity - Dermal Category 3
Acute Toxicity - Oral Category 3

GHS Signal Word:

Danger

GHS Hazard:

Highly flammable liquid and vapour.
Toxic if swallowed, in contact with skin or if inhaled.
Toxic if inhaled.
Causes damage to organs.

GHS Precautions:

Safety Precautions:

Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilation and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapours/spray.
Wash hands and skin thoroughly after handling.
Do no eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Measures:

IF SWALLOWED: Immediately call a POISON CENTER/doctor/....
IF ON SKIN: Wash with plenty of soap and water.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
IF exposed: Call a POISON CENTER or doctor/physician.
Call a POISON CENTER or doctor/physician if you feel unwell.
Specific treatment see section 4.

	Specific measures see section 4. Rinse mouth. Remove/Take off immediately all contaminated clothing. Wash contaminated clothing before reuse. In case of fire: Use extinguishing media in section 5 for extinction.
Storage:	Store in a well-ventilated place. Keep container tightly closed. Store in a well-ventilated place. Keep cool. Store locked up.
Disposal:	Dispose of contents/container according to section 13 of the SDS.
Single Exposure Target Organs:	No data available.
Repeated Exposure Target Organs:	No data available.

3. COMPOSITION / INFORMATION ON INGREDIENTS

Chemical Name	CAS #	EINEC #	% Composition
methanol	67-56-1	200-659-6	99.900000
aldrin	309-00-2	206-215-8	0.100000

4. FIRST-AID MEASURES

Inhalation:	Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen. If not breathing, give artificial respiration and have a trained individual administer oxygen. Get medical attention immediately
Eyes:	Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.
Skin Contact:	Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.
Ingestion:	Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this SDS.

5. FIRE- FIGHTING MEASURES

Extinguishing Media:	Use alcohol resistant foam, carbon dioxide, or dry chemical extinguishing agents. Water may be ineffective but water spray can be used extinguish a fire if swept across the base of the flames. Water can absorb heat and keep exposed material from being damaged by fire.
Fire and/or Explosion Hazards:	Vapors may be ignited by sparks, flames or other sources of ignition if material is above the flash point giving rise to a fire (Class B). Vapors are heavier than air and may travel to a source of ignition and flash back.
Fire Fighting Methods and Protection:	Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Flammable component(s) of this material may be lighter than water and burn while floating on the surface.
Hazardous Combustion Products:	Carbon dioxide, Carbon monoxide

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Equipment:	Exposure to the spilled material may be severely irritating or toxic. Follow personal protective equipment recommendations found in Section 8 of this SDS. Personal protective equipment needs must be evaluated based on information provided on this sheet and the special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred, and the expertise of employees in the area responding to the spill. Never exceed any occupational exposure limits.
Methods for Clean-up:	Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal

protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

7. HANDLING AND STORAGE

Handling Technical Measures and Precautions: Toxic or severely irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area. Use spark-proof tools and explosion-proof equipment

Storage Technical Measures and Conditions: Store in a cool dry ventilated location. Isolate from incompatible materials and conditions. Keep container(s) closed. Keep away from sources of ignition

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

Chemical Name	CAS No.	IDLH	ACGIH STEL	ACGIH TLV-TWA	OSHA Exposure Limit
methanol	67-56-1	6000 ppm IDLH	250 ppm STEL	200 ppm TWA	200 ppm TWA; 260 mg/m3 TWA
aldrin	309-00-2	ND		0.05 mg/m3 TWA (inhalable fraction and vapor)	0.25 mg/m3 TWA

Personal Protection:

Engineering Measures: Local exhaust ventilation is recommended when generating excessive levels of vapors from handling or thermal processing.

Respiratory Protection: Respiratory protection may be required to avoid overexposure when handling this product. General or local exhaust ventilation is the preferred means of protection. Use a respirator if general room ventilation is not available or sufficient to eliminate symptoms.If an exposure limit is exceeded or if an operator is experiencing symptoms of inhalation overexposure as explained in Section 3, provide respiratory protection.

Eye Protection: Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.

Skin Protection: Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance, color:	No data available.
Odor:	Mild
Physical State:	No data available.
pH:	No data available
Vapor Density:	1.1 (air = 1)
Melting Point:	-98 °C
Flash Point:	52
Flammability:	Highly Flammable
Upper Flammable/Explosive Limit, % in air:	36.0
Lower Flammable/Explosive Limit, % in air:	6.0
Autoignition Temperature:	464 deg C
Decomposition Temperature:	No data available.
Specific Gravity:	0.791 - 0.792 g/cm3 at 20 °C
Evaporation Rate:	No data available.
Odor Threshold:	No data available.
Solubility:	Moderate; 50-99%
Partition Coefficient: n-octanol in water:	No data available.
VOC % by weight:	99.90
Molecular Weight:	32.04

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions.
Conditions to Avoid:	No data available.
Materials to Avoid / Chemical Incompatiability:	Strong oxidizing agents
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Routes of Entry: Inhalation, Skin Contact, Eye Contact, Ingestion

Target Organs Potentially Affected By Exposure: Eyes, Central nervous system stimulation, Skin, GI Tract, Respiratory Tract

Chemical Interactions That Change Toxicity: None Known

Immediate (Acute) Health Effects by Route of Exposure:

Inhalation Irritation: Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.

Inhalation Toxicity: Harmful! Can cause systemic damage (see "Target Organs)Methanol can cause central nervous system depression and overexposure can cause damage to the optic nerve resulting in visual impairment or blindness.

Skin Contact: Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.

Eye Contact: Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.

Ingestion Irritation: Irritating to mouth, throat, and stomach. Can cause abdominal discomfort, nausea, vomiting and diarrhea.Highly toxic and may be fatal if swallowed.

Ingestion Toxicity: Toxic if swallowed. May cause target organ failure and/or death.May be fatal if swallowed.

Long-Term (Chronic) Health Effects:

Carcinogenicity: Contains a probable or known human carcinogen.

Reproductive and Developmental Toxicity: Contains a known human reproductive and/or developmental hazard.

Inhalation: Upon prolonged and/or repeated exposure, can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.Harmful! Can cause systemic damage upon prolonged and/or repeated exposure (see "Target Organs)

Skin Contact: Upon prolonged or repeated contact, can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.

Ingestion: Toxic if swallowed. May cause target organ failure and/or death.

Component Toxicological Data:

NIOSH:

Chemical Name	CAS No.	LD50/LC50
Methanol	67-56-1	Oral LD50 Rat 5628 mg/kg (Source: NLM_CIP); Inhalation LC50 Rat 83.2 mg/L 4 h (Source: IUCLID)

Component Carcinogenic Data:

OSHA:

Chemical Name	CAS No.
No data available.	

ACGIH:

Chemical Name	CAS No.
No data available.	

NIOSH:

Chemical Name	CAS No.
No data available.	

NTP:

Chemical Name	CAS No.
No data available.	

IARC:

Chemical Name	CAS No.	Group No.
No data.		Group 1
No data.		Group 2A
No data.		Group 2B

12. ECOLOGICAL INFORMATION

Overview: Moderate ecological hazard. This product may be dangerous

to plants and/or wildlife.

Mobility: No data
Persistence: No data
Bioaccumulation: No data
Degradability: Biodegrades slowly.
Ecological Toxicity Data: No data available.

13. DISPOSAL CONSIDERATIONS

Waste Description of Spent Product: Spent or discarded material is a hazardous waste.
Disposal Methods: Dispose of by incineration following Federal, State, Local, or Provincial regulations.
Waste Disposal of Packaging: Comply with all Local, State, Federal, and Provincial Environmental Regulations.

14. TRANSPORTATION INFORMATION

United States:
DOT Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3
Packing Group: II

International:
IATA Proper Shipping Name: Methanol
UN Number: UN1230
Hazard Class: 3 (6.1)
Packing Group: II

Marine Pollutant: No

15. REGULATORY INFORMATION

United States:

Chemical Name	CAS#	CERCLA	SARA 313	SARA EHS 313	TSCA
methanol	67-56-1	X	X	-	X
aldrin	309-00-2	X	X	X	-

The following chemicals are listed on CA Prop 65:

Chemical Name	CAS #	Regulation
Aldrin	309-00-2	Prop 65 Cancer
Methanol	67-56-1	Prop 65 Devolop Tox

State Right To Know Listing:

Chemical Name	CAS#	New Jersey	Massachusetts	Pennsylvania	California
methanol	67-56-1	X	X	X	X
aldrin	309-00-2	X	X	X	X

16. OTHER INFORMATION

Prior Version Date: 03/23/11
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SAFETY DATA SHEET

Version 5.8
Revision Date 06/02/2016
Print Date 08/02/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : α-BHC

Product Number : 48493
Brand : Supelco
Index-No. : 602-042-00-0

CAS-No. : 319-84-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	α-1,2,3,4,5,6-Hexachlorocyclohexane
Formula	:	C6H6Cl6
Molecular weight	:	290.83 g/mol
CAS-No.	:	319-84-6
EC-No.	:	206-270-8
Index-No.	:	602-042-00-0

Hazardous components

Component	Classification	Concentration
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312, H351, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	156.0 - 161.0 °C (312.8 - 321.8 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.80
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 177.0 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans ((1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)
IARC:	2B - Group 2B: Possibly carcinogenic to humans ((1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be a human carcinogen ((1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)
NTP:	Reasonably anticipated to be a human carcinogen ((1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GV3500000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Carassius auratus (goldfish) - 0.12 mg/l - 48.0 h
	LC50 - Cyprinus carpio (Carp) - 0.2 mg/l - 48.0 h
	LC50 - other fish - 1.49 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.20 - 1.70 mg/l - 48 h
Toxicity to algae	EC50 - No information available. - > 100.00 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: other fish - 96 h
- 0.8 mg/l

Bioconcentration factor (BCF): 250

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. ((1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)
Reportable Quantity (RQ): 10 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. ((1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

IATA
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. ((1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
(1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. (1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2009-02-01
WARNING! This product contains a chemical known to the State of California to cause cancer. (1α,2α,3β,4α,5β,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-84-6	2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0
Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8 Revision Date: 06/02/2016 Print Date: 08/02/2019

SAFETY DATA SHEET

Version 4.8
Revision Date 05/03/2017
Print Date 07/13/2017

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : α-Chlordane

Product Number : 442449
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)

H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Molecular weight : 409.8 g/mol
EC-No. : 225-825-5

Hazardous components

Component	Classification	Concentration
Chlordane		
	Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H302 + H332, H315, H319, H335, H351, H410	90 - 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	93.0 - 94.0 °C (199.4 - 201.2 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available

i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 500 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chlordane)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 0.0074 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 24 h - 0.005 mg/l
	Bioconcentration factor (BCF): 322

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Chlordane)
Reportable Quantity (RQ): Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Chlordane)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Chlordane)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

	CAS-No.	Revision Date
Chlordane	5103-71-9	

New Jersey Right To Know Components

	CAS-No.	Revision Date
Chlordane	5103-71-9	

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H302 + H332	Harmful if swallowed or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.8 Revision Date: 05/03/2017 Print Date: 07/13/2017

SAFETY DATA SHEET
Aluminum (pieces)

1. Identification

Product identifier

Product name Aluminum (pieces)

Internal identification Replaces M-1000-010

CAS number 7429-90-5

Recommended use of the chemical and restrictions on use

Application Exterior surface coating.

Uses advised against No specific uses advised against are identified.

Details of the supplier of the safety data sheet

Supplier Kurt J Lesker Company

Manufacturer Kurt J Lesker Company
1925 Route 51
Jefferson Hills, PA 15025
+1 412-387-9200

Kurt J Lesker Company LTD
United Kingdom
15-16 Burgess Road
Hastings, East Sussex, TN35 4NR
England
Customer Service: +44 (0) 1424 458100
msds@lesker.com

Emergency telephone number

Emergency telephone North America [USA, Canada, Mexico]: 1-866-519-4752
Mainland China: (+86) 4001 2001 74
Europe: {int'l call prefix}-1-760-476-3961
Asia Pacific: {int'l call prefix}-1-760-476-3960
Middle East & Africa: {int'l call prefix}-1-760-476-3959

2. Hazard(s) identification

Classification of the substance or mixture

Physical hazards Not Classified

Health hazards Not Classified

Environmental hazards Not Classified

Label elements

Hazard statements NC Not Classified

Other hazards

Aluminum (pieces)

This product does not contain any substances classified as PBT or vPvB. Based on available knowledge of this material, it has been determined to be non-hazardous and will not pose a risk to persons or the environment in its provided form. However, any cutting, welding, melting, grinding, or use for deposition will produce dust, fume, or particulates containing component elements of this material. Exposure to these components may present significant health hazards. Note: Fine particulate may be a combustible dust which, when dispersed in air, may present an explosion hazard.

3. Composition/information on ingredients

Mixtures

Aluminum (pieces) CAS number: 7429-90-5	**0 - 100%**

Classification
Not Classified

The full text for all hazard statements is displayed in Section 16.

4. First-aid measures

Description of first aid measures

General information If in doubt, get medical attention promptly. Show this Safety Data Sheet to the medical personnel.

Inhalation Move affected person to fresh air and keep warm and at rest in a position comfortable for breathing. Loosen tight clothing such as collar, tie or belt. Get medical attention if symptoms are severe or persist.

Ingestion Rinse mouth thoroughly with water. Get medical advice/attention if you feel unwell. Do not induce vomiting unless under the direction of medical personnel.

Skin Contact Rinse with water.

Eye contact Rinse with water. Get medical attention if any discomfort continues.

Protection of first aiders First aid personnel should wear appropriate protective equipment during any rescue.

Most important symptoms and effects, both acute and delayed

General information The severity of the symptoms described will vary dependent on the concentration and the length of exposure.

Inhalation No specific symptoms known.

Ingestion No specific symptoms known.

Skin contact Prolonged contact may cause dryness of the skin.

Eye contact No specific symptoms known. May be slightly irritating to eyes.

Indication of immediate medical attention and special treatment needed

Notes for the doctor Treat symptomatically.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media The product is flammable. Extinguish with alcohol-resistant foam, carbon dioxide or dry powder. Use fire-extinguishing media suitable for the surrounding fire.

Unsuitable extinguishing media Do not use water, if avoidable.

Aluminum (pieces)

Special hazards arising from the substance or mixture

Specific hazards Reacts with water. Flammable solid. Dust may form explosive mixture with air. Fire-water run-off in sewers may create fire or explosion hazard.

Hazardous combustion products Thermal decomposition or combustion products may include the following substances: Harmful gases or vapors.

Advice for firefighters

Protective actions during firefighting Avoid breathing fire gases or vapors. Evacuate area. Control run-off water by containing and keeping it out of sewers and watercourses. If risk of water pollution occurs, notify appropriate authorities.

Special protective equipment for firefighters Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing. Standard Firefighter's clothing including helmets, protective boots and gloves will provide a basic level of protection for chemical incidents.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Wear protective clothing as described in Section 8 of this safety data sheet. No action shall be taken without appropriate training or involving any personal risk. Evacuate area. Provide adequate ventilation. No smoking, sparks, flames or other sources of ignition near spillage. Promptly remove any clothing that becomes contaminated.

Environmental precautions

Environmental precautions Avoid discharge into drains or watercourses or onto the ground.

Methods and material for containment and cleaning up

Methods for cleaning up Wear protective clothing as described in Section 8 of this safety data sheet. Clear up spills immediately and dispose of waste safely. Eliminate all ignition sources if safe to do so. No smoking, sparks, flames or other sources of ignition near spillage. Do not allow material to enter confined spaces, due to the risk of explosion. Collect spillage with a shovel and broom, or similar and reuse, if possible. Collect and place in suitable waste disposal containers and seal securely. Flush contaminated area with plenty of water. Wash thoroughly after dealing with a spillage. For waste disposal, see Section 13.

Reference to other sections For personal protection, see Section 8. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

7. Handling and storage

Precautions for safe handling

Usage precautions Read and follow manufacturer's recommendations. Wear protective clothing as described in Section 8 of this safety data sheet. Keep away from food, drink and animal feeding stuffs. Keep container tightly sealed when not in use. The product is flammable. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Do not handle until all safety precautions have been read and understood. Do not handle broken packages without protective equipment. Do not reuse empty containers.

Advice on general occupational hygiene Wash promptly if skin becomes contaminated. Take off contaminated clothing and wash before reuse. Wash contaminated clothing before reuse.

Conditions for safe storage, including any incompatibilities

Storage precautions Keep away from oxidizing materials, heat and flames. Avoid contact with water. Keep only in the original container. Keep container tightly closed, in a cool, well ventilated place. Keep containers upright. Protect containers from damage.

Aluminum (pieces)

Storage class Water-reactive storage.

Specific end uses(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.

8. Exposure Controls/personal protection

Control parameters

Occupational exposure limits

Aluminum (pieces)

Long-term exposure limit (8-hour TWA): OSHA 5 mg/m³ respirable fraction
as Al
Long-term exposure limit (8-hour TWA): OSHA 15 mg/m³ total dust
as Al
Long-term exposure limit (8-hour TWA): ACGIH 1 mg/m³ respirable fraction
A4
OSHA = Occupational Safety and Health Administration.
ACGIH = American Conference of Governmental Industrial Hygienists.
A4 = Not Classifiable as a Human Carcinogen.

Exposure controls

Protective equipment



Appropriate engineering controls Provide adequate ventilation. Observe any occupational exposure limits for the product or ingredients.

Eye/face protection Unless the assessment indicates a higher degree of protection is required, the following protection should be worn: Tight-fitting safety glasses.

Hand protection No specific hand protection recommended.

Other skin and body protection Wear appropriate clothing to prevent repeated or prolonged skin contact.

Hygiene measures Wash hands thoroughly after handling. Wash at the end of each work shift and before eating, smoking and using the toilet. Do not eat, drink or smoke when using this product.

Respiratory protection Ensure all respiratory protective equipment is suitable for its intended use and is NIOSH approved. Check that the respirator fits tightly and the filter is changed regularly. Gas and combination filter cartridges should comply with OSHA 1910.134. Full face mask respirators with replaceable filter cartridges should comply with OSHA 1910.134. Half mask and quarter mask respirators with replaceable filter cartridges should comply with OSHA 1910.134.

Environmental exposure controls Keep container tightly sealed when not in use.

9. Physical and Chemical Properties

Information on basic physical and chemical properties

Appearance Solid.

Color Silver.

Odor No characteristic odor.

Odor threshold Not applicable.

Aluminum (pieces)

pH	Not applicable.
Melting point	660°C
Initial boiling point and range	Not available.
Flash point	Not applicable.
Evaporation rate	Not applicable.
Flammability (solid, gas)	Not applicable.
Upper/lower flammability or explosive limits	Not applicable.
Vapor pressure	Not available.
Vapor density	Not available.
Relative density	2.70 @ 25°C
Bulk density	Not available.
Solubility(ies)	Insoluble in water.
Partition coefficient	Not applicable.
Auto-ignition temperature	Not applicable.
Decomposition Temperature	Not available.
Viscosity	Not applicable.
Molecular weight	26.98

10. Stability and reactivity

Reactivity	There are no known reactivity hazards associated with this product.
Stability	Stable at normal ambient temperatures and when used as recommended. Stable under the prescribed storage conditions.
Possibility of hazardous reactions	Reacts strongly with water. The following materials may react strongly with the product: Oxidizing agents.
Conditions to avoid	Avoid heat, flames and other sources of ignition. Static electricity and formation of sparks must be prevented.
Materials to avoid	Water. Oxidizing materials. Acids - oxidizing.
Hazardous decomposition products	Does not decompose when used and stored as recommended. Thermal decomposition or combustion products may include the following substances: Harmful gases or vapors.

11. Toxicological information

Information on toxicological effects

Acute toxicity - oral

Notes (oral LD_{50}) Based on available data the classification criteria are not met.

Acute toxicity - dermal

Notes (dermal LD_{50}) Based on available data the classification criteria are not met.

Acute toxicity - inhalation

Aluminum (pieces)

Notes (inhalation LC_{50}) Based on available data the classification criteria are not met.

Skin corrosion/irritation

Animal data Based on available data the classification criteria are not met.

Serious eye damage/irritation

Serious eye damage/irritation Based on available data the classification criteria are not met.

Respiratory sensitization

Respiratory sensitization Based on available data the classification criteria are not met.

Skin sensitization

Skin sensitization Based on available data the classification criteria are not met.

Germ cell mutagenicity

Genotoxicity - in vitro Based on available data the classification criteria are not met.

Carcinogenicity

Carcinogenicity Based on available data the classification criteria are not met.

IARC carcinogenicity None of the ingredients are listed or exempt.

Reproductive toxicity

Reproductive toxicity - fertility Based on available data the classification criteria are not met.

Reproductive toxicity - development Based on available data the classification criteria are not met.

Specific target organ toxicity - single exposure

STOT - single exposure Not classified as a specific target organ toxicant after a single exposure.

Specific target organ toxicity - repeated exposure

STOT - repeated exposure Not classified as a specific target organ toxicant after repeated exposure.

Aspiration hazard

Aspiration hazard Not relevant. Solid.

General information The severity of the symptoms described will vary dependent on the concentration and the length of exposure.

Inhalation No specific symptoms known.

Ingestion No specific symptoms known.

Skin Contact Prolonged contact may cause dryness of the skin.

Eye contact No specific symptoms known.

Route of exposure Ingestion Inhalation Skin and/or eye contact

Target Organs No specific target organs known.

12. Ecological Information

Ecotoxicity Not regarded as dangerous for the environment. However, large or frequent spills may have hazardous effects on the environment.

Toxicity Based on available data the classification criteria are not met.

Persistence and degradability

Aluminum (pieces)

Persistence and degradability Reacts with water.

Bioaccumulative potential

Bio-Accumulative Potential No data available on bioaccumulation.

Partition coefficient Not applicable.

Mobility in soil

Mobility No data available.

Other adverse effects

Other adverse effects None known.

13. Disposal considerations

Waste treatment methods

General information The generation of waste should be minimized or avoided wherever possible. Reuse or recycle products wherever possible. This material and its container must be disposed of in a safe way. When handling waste, the safety precautions applying to handling of the product should be considered. Care should be taken when handling emptied containers that have not been thoroughly cleaned or rinsed out. Empty containers or liners may retain some product residues and hence be potentially hazardous.

Disposal methods Dispose of surplus products and those that cannot be recycled via a licensed waste disposal contractor. Waste, residues, empty containers, discarded work clothes and contaminated cleaning materials should be collected in designated containers, labeled with their contents. Incineration or landfill should only be considered when recycling is not feasible.

14. Transport information

General The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, DOT).

UN Number

Not applicable.

UN proper shipping name

Not applicable.

Transport hazard class(es)

No transport warning sign required.

Transport labels

No transport warning sign required.

DOT transport labels

No transport warning sign required.

Packing group

Not applicable.

Environmental hazards

Environmentally Hazardous Substance

No.

Special precautions for user

Aluminum (pieces)

Based on available knowledge of this material, it has been determined to be non-hazardous and will not pose a risk to persons or the environment in its provided form. However, any cutting, welding, melting, grinding, or use for deposition will produce dust, fume, or particulates containing component elements of this material. Exposure to these components may present significant health hazards. Note: Fine particulate may be a combustible dust which, when dispersed in air, may present an explosion hazard.

DOT TIH Zone Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities
None of the ingredients are listed or exempt.

CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)
None of the ingredients are listed or exempt.

SARA Extremely Hazardous Substances EPCRA Reportable Quantities
None of the ingredients are listed or exempt.

SARA 313 Emission Reporting
None of the ingredients are listed or exempt.

CAA Accidental Release Prevention
None of the ingredients are listed or exempt.

FDA - Essential Chemical
None of the ingredients are listed or exempt.

FDA - Precursor Chemical
None of the ingredients are listed or exempt.

SARA (311/312) Hazard Categories
None of the ingredients are listed or exempt.

OSHA Highly Hazardous Chemicals
None of the ingredients are listed or exempt.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins
None of the ingredients are listed or exempt.

California Air Toxics "Hot Spots" (A-I)
None of the ingredients are listed or exempt.

California Air Toxics "Hot Spots" (A-II)
None of the ingredients are listed or exempt.

California Directors List of Hazardous Substances
None of the ingredients are listed or exempt.

Massachusetts "Right To Know" List
None of the ingredients are listed or exempt.

Aluminum (pieces)

Rhode Island "Right To Know" List
None of the ingredients are listed or exempt.

Minnesota "Right To Know" List
None of the ingredients are listed or exempt.

New Jersey "Right To Know" List
None of the ingredients are listed or exempt.

Pennsylvania "Right To Know" List
None of the ingredients are listed or exempt.

Inventories

US - TSCA
None of the ingredients are listed or exempt.

US - TSCA 12(b) Export Notification
None of the ingredients are listed or exempt.

16. Other information

Training advice	Only trained personnel should use this material.
Revision date	5/9/2018
Revision	7
Supersedes date	5/9/2018
SDS No.	4661

End of SDS

This information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process. Such information is, to the best of the company's knowledge and belief, accurate and reliable as of the date indicated. However, no warranty, guarantee or representation is made to its accuracy, reliability or completeness. It is the user's responsibility to satisfy himself as to the suitability of such information for his own particular use.

SAFETY DATA SHEET

Version 4.9
Revision Date 04/20/2015
Print Date 12/11/2015

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Anthracene

Product Number : A89200
Brand : Aldrich

CAS-No. : 120-12-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.

P280	Wear protective gloves.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Photosensitizer., Lachrymator.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_{14}H_{10}$
Molecular weight	:	178.23 g/mol
CAS-No.	:	120-12-7
EC-No.	:	204-371-1

Hazardous components

Component	Classification	Concentration
Anthracene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 1; H315, H319, H335, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Anthracene	120-12-7	TWA	0.200000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	1910.1002 As used in §1910.1000 (Table Z-1), coal tar pitch volatiles include the fused polycyclic hydrocarbons which volatilize from the distillation residues of coal, petroleum (excluding asphalt), wood, and other organic matter. Asphalt (CAS 8052-42-4, and CAS 64742-93-4) is not covered under the 'coal tar pitch volatiles' standard OSHA specifically regulated carcinogen		

		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen NIOSH considers coal tar, coal tar pitch, and creosote to be coal tar products. cyclohexane-extractable fraction See Appendix C See Appendix A		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Anthracene	120-12-7	1-Hydroxypyrene (1-HP)		Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 480 min
Material tested:Camapren® (KCL 722 / Aldrich Z677493, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 30 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 210 - 215 °C (410 - 419 °F) - lit.
f)	Initial boiling point and boiling range	340 °C (644 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0.6 %(V)
k)	Vapour pressure	1.3 hPa (1.0 mmHg) at 145.0 °C (293.0 °F)
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 4.45
p)	Auto-ignition temperature	540.0 °C (1,004.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents, Hypochlorites

10.6 Hazardous decomposition products

Other decomposition products - No data available

In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
Inhalation: No data available

Dermal: No data available

LD50 Intraperitoneal - Mouse - 430 mg/kg

Skin corrosion/irritation
Skin - Mouse
Result: Mild skin irritation

Serious eye damage/eye irritation
Irritating to eyes. The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Respiratory or skin sensitisation
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Anthracene)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	OSHA specifically regulated carcinogen (Anthracene)

Reproductive toxicity

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.
The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CA9350000

Possible tumor promoter., Headache, Nausea, Weakness

Blood -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 0.001 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.10 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Indication of bioaccumulation.
Bioaccumulation Pimephales promelas (fathead minnow) - 42 d
- 0.01191 mg/l

Bioconcentration factor (BCF): 649

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Anthracene)
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Anthracene)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Anthracene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Anthracene	120-12-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Anthracene	120-12-7	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9 Revision Date: 04/20/2015 Print Date: 12/11/2015

Antimony

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision Date: 02/12/2014 Version: 1.0

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY

1.1. Product Identifier

Product Form: Substance

Product Name: Antimony

Synonyms: Stibium (Sb)

1.2. Intended Use of the Product No additional information available

1.3. Name, Address, and Telephone of the Responsible Party

Company

Atomized Products Group, Inc
3838 Miller Park Dr
Garland, TX 75042
T 972-272-9596
atomizedproductsgroup.com

1.4. Emergency Telephone Number

Emergency Number : 800-255-3924 (CHEMTEL)

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the Substance or Mixture

Classification (GHS-US)

Comb. Dust
Acute Tox. 3 (Oral) H301
Acute Tox. 4 (Inhalation:dust,mist) H332
Carc. 2 H351
Aquatic Acute 2 H401
Aquatic Chronic 2 H411

2.2. Label Elements

GHS-US Labeling

Hazard Pictograms (GHS-US) :



GHS06 GHS07 GHS08 GHS09

Signal Word (GHS-US) : Danger

Hazard Statements (GHS-US) : May form combustible dust concentrations in air
H301 - Toxic if swallowed
H332 - Harmful if inhaled
H351 - Suspected of causing cancer
H401 - Toxic to aquatic life
H411 - Toxic to aquatic life with long lasting effects

Precautionary Statements (GHS-US) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P261 - Avoid breathing dust.
P264 - Wash hands, forearms, and other exposed areas thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P273 - Avoid release to the environment.
P280 - Wear protective gloves, protective clothing, eye protection, face protection, respiratory protection.
P301+P310 - IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
P304+P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P308+P313 - If exposed or concerned: Get medical advice/attention.

P312 - Call a POISON CENTER/doctor/physician if you feel unwell.
P321 - Specific treatment (see section 4).
P330 - If swallowed, rinse mouth.
P391 - Collect spillage.
P405 - Store locked up.
P501 - Dispose of contents/container to local, regional, national, territorial, provincial, and international regulations.

2.3. Other Hazards

Other Hazards Not Contributing to the Classification: Exposure may aggravate those with pre-existing eye, skin, or respiratory conditions. May form combustible dust concentrations in air. Exposure may aggravate individuals with pre-existing skin, kidney, liver, and pulmonary disorders. On burning release of harmful/irritant gases/vapours (antimony oxides). Inhalation of dusts and fumes can cause metal fume fever. Symptoms can include a metallic or sweet taste in the mouth, sweating, shivering, headache, throat irritation, fever, chills, thirstiness, muscle aches, nausea, vomiting, weakness, fatigue, and shortness of breath.

2.4. Unknown Acute Toxicity (GHS-US)

No data available

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.1. Substance

Name : Antimony

Name	Product identifier	%	Classification (GHS-US)
Antimony	(CAS No) 7440-36-0	100	Comb. Dust Acute Tox. 3 (Oral), H301 Acute Tox. 4 (Inhalation), H332 Carc. 2, H351 Aquatic Acute 2, H401 Aquatic Chronic 2, H411

Full text of H-phrases: see section 16

3.2. Mixture

Not applicable

SECTION 4: FIRST AID MEASURES

4.1. Description of First Aid Measures

First-aid Measures General: Never give anything by mouth to an unconscious person. If you feel unwell, seek medical advice (show the label where possible).

First-aid Measures After Inhalation: When symptoms occur: go into open air and ventilate suspected area. Obtain medical attention if breathing difficulty persists.

First-aid Measures After Skin Contact: Remove contaminated clothing. Drench affected area with water for at least 15 minutes. Obtain medical attention if irritation persists.

First-aid Measures After Eye Contact: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Obtain medical attention if irritation persists.

First-aid Measures After Ingestion: Rinse mouth. Do not induce vomiting. Seek medical attention if a large amount is swallowed.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/Injuries: Suspected of causing cancer. Toxic if swallowed. Harmful if inhaled.

Symptoms/Injuries After Inhalation: Harmful if inhaled. Respiratory tract irritation.

Symptoms/Injuries After Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Eye Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Ingestion: Toxic if swallowed. May cause nausea, vomiting, and diarrhea.

Chronic Symptoms: Prolonged exposure may cause effects in specific organs such as the liver, kidneys, blood, and nervous system.

4.3. Indication of Any Immediate Medical Attention and Special Treatment Needed

If exposed or concerned, get medical advice and attention.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing Media

Suitable Extinguishing Media: Use extinguishing media appropriate for surrounding fire.

Unsuitable Extinguishing Media: Do not use a heavy water stream. Use of heavy stream of water may spread fire.

5.2. Special Hazards Arising From the Substance or Mixture

Fire Hazard: Not considered flammable but may burn at high temperatures. Dust explosion hazard in air.

Explosion Hazard: Avoid dust clouds in combination with static electricity. Dust explosion hazard in air.

Reactivity: Hazardous reactions will not occur under normal conditions. Dust clouds can be explosive.

5.3. Advice for Firefighters

Precautionary Measures Fire: Exercise caution when fighting any chemical fire.

Firefighting Instructions: Use water spray or fog for cooling exposed containers. In case of major fire and large quantities: Evacuate area. Fight fire remotely due to the risk of explosion.

Protection During Firefighting: Do not enter fire area without proper protective equipment, including respiratory protection.

Other information: Risk of dust explosion. Do not allow the product to be released into the environment. Do not allow run-off from fire fighting to enter drains or water courses.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal Precautions, Protective Equipment and Emergency Procedures

General Measures: Use special care to avoid static electric charges. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Handle in accordance with good industrial hygiene and safety practice. Do not breathe dust. Avoid generating dust. Avoid all contact with skin, eyes, or clothing.

6.1.1. For Non-emergency Personnel

Protective Equipment: Use appropriate personal protection equipment (PPE).

Emergency Procedures: Evacuate unnecessary personnel.

6.1.2. For Emergency Responders

Protective Equipment: Equip cleanup crew with proper protection. Use appropriate personal protection equipment (PPE).

Emergency Procedures: Ventilate area.

6.2. Environmental Precautions

Prevent entry to sewers and public waters. Do not allow to enter drains or water courses.

6.3. Methods and Material for Containment and Cleaning Up

For Containment: Avoid generation of dust during clean-up of spills. Use only non-sparking tools.

Methods for Cleaning Up: Clear up spills immediately and dispose of waste safely. Avoid generation of dust during clean-up of spills. Use only non-sparking tools. Use explosion proof vacuum during cleanup, with appropriate filter, do not mix with other materials. Contact competent authorities after a spill.

6.4. Reference to Other Sections

See heading 8, Exposure Controls and Personal Protection.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for Safe Handling

Additional Hazards When Processed: Avoid dust production. Accumulation and dispersion of dust with an ignition source can cause a combustible dust explosion, keep dust levels to a minimum and follow applicable regulations. Do not pressurize, cut, or weld containers. . On burning: release of harmful/irritant gases/vapours e.g.: (antimony oxides).

Precautions for Safe Handling: Use only non-sparking tools. Keep away from heat/sparks/open flames/hot surfaces. – No smoking. Handle in accordance with good industrial hygiene and safety procedures.

Hygiene Measures: Handle in accordance with good industrial hygiene and safety procedures. Wash hands and other exposed areas with mild soap and water before eating, drinking, or smoking and again when leaving work. Do no eat, drink or smoke when using this product.

7.2. Conditions for Safe Storage, Including Any Incompatibilities

Technical Measures: Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating, and lighting equipment. Comply with applicable regulations.

Storage Conditions: Store in a dry, cool and well-ventilated place. Keep container closed when not in use. Keep/Store away from extremely high or low temperatures, ignition sources, incompatible materials.

Incompatible Products: Strong acids. Strong bases. Strong oxidizers.

7.3. Specific End Use(s)

No additional information available

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control Parameters

Antimony (7440-36-0)		
USA ACGIH	ACGIH TWA (mg/m³)	0.5 mg/m³
USA NIOSH	NIOSH REL (TWA) (mg/m³)	0.5 mg/m³

USA IDLH	US IDLH (mg/m³)	50 mg/m³
USA OSHA	OSHA PEL (TWA) (mg/m³)	0.5 mg/m³

8.2. Exposure Controls

Appropriate Engineering Controls : Ensure all national/local regulations are observed. Proper grounding procedures to avoid static electricity should be followed. Use explosion-proof equipment. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment : Gloves. Protective goggles. Respiratory protection of the dependent type. Protective clothing.



Materials for Protective Clothing : Chemically resistant materials and fabrics.

Hand Protection : Wear chemically resistant protective gloves.

Eye Protection : Chemical goggles or safety glasses.

Skin and Body Protection : Wear suitable protective clothing.

Respiratory Protection : Use NIOSH-approved air-purifying or supplied-air respirator where airborne concentrations of dust are expected to exceed exposure limits.

Thermal Hazard Protection : Wear suitable protective clothing.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on Basic Physical and Chemical Properties

Physical State : Solid

Odor : No data available

Odor Threshold : No data available

pH : No data available

Relative Evaporation Rate (butylacetate=1) : No data available

Melting Point : No data available

Freezing Point : No data available

Boiling Point : No data available

Flash Point : No data available

Auto-ignition Temperature : No data available

Decomposition Temperature : No data available

Flammability (solid, gas) : No data available

Vapor Pressure : No data available

Relative Vapor Density at 20 °C : No data available

Relative Density : No data available

Specific Gravity : No data available

Solubility : No data available

Log Pow : No data available

Log Kow : No data available

Viscosity, Kinematic : No data available

Viscosity, Dynamic : No data available

Explosive Properties : No data available

Oxidizing Properties : No data available

Explosive Limits : No data available

9.2. Other Information No additional information available

SECTION 10: STABILITY AND REACTIVITY

10.1 Reactivity: Hazardous reactions will not occur under normal conditions. Dust clouds can be explosive.

10.2 Chemical Stability: Dust clouds can be explosive.

10.3 Possibility of Hazardous Reactions: Hazardous polymerization will not occur.

10.4 Conditions to Avoid: Direct sunlight. Extremely high or low temperatures. Open flame. Ignition sources. Incompatible materials.

10.5 Incompatible Materials: Strong acids. Strong bases. Strong oxidizers. Halogenated compounds.

10.6 Hazardous Decomposition Products: Antimony and its oxides. Metal oxides. Inhalation of fumes may cause metal fume fever.

SECTION 11: TOXICOLOGICAL INFORMATION

11.1. Information On Toxicological Effects

Acute Toxicity: Toxic if swallowed. Harmful if inhaled.

Antimony	
ATE (Oral)	500.000 mg/kg body weight
ATE (Dust/Mist)	1.500 mg/l/4h

Antimony (7440-36-0)	
LD50 Oral Rat	100 mg/kg
ATE (Oral)	100.000 mg/kg body weight

Skin Corrosion/Irritation: Not classified

Serious Eye Damage/Irritation: Not classified

Respiratory or Skin Sensitization: Not classified

Germ Cell Mutagenicity: Not classified

Carcinogenicity: Suspected of causing cancer.

Reproductive Toxicity: Not classified

Specific Target Organ Toxicity (Single Exposure): Not classified

Specific Target Organ Toxicity (Repeated Exposure): Not classified

Aspiration Hazard: Not classified

Symptoms/Injuries After Inhalation: Harmful if inhaled. Respiratory tract irritation.

Symptoms/Injuries After Skin Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Eye Contact: Prolonged contact with large amounts of dust may cause mechanical irritation.

Symptoms/Injuries After Ingestion: Toxic if swallowed. May cause nausea, vomiting, and diarrhea.

Chronic Symptoms: Prolonged exposure may cause effects in specific organs such as the liver, kidneys, blood, and nervous system.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity

Ecology - General : Toxic to aquatic life with long lasting effects.

12.2. Persistence and Degradability

Antimony	
Persistence and Degradability	May cause long-term adverse effects in the environment.

12.3. Bioaccumulative Potential No additional information available

12.4. Mobility in Soil No additional information available

12.5. Other Adverse Effects

Other Information : Avoid release to the environment.

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste Disposal Recommendations: Dispose of waste material in accordance with all local, regional, national, and international regulations.

Additional Information: The materials contained within this product are hazardous to the environment, do not release into the environment.

SECTION 14: TRANSPORT INFORMATION

14.1 In Accordance with DOT

Proper Shipping Name : ANTIMONY POWDER
Hazard Class : 6.1
Identification Number : UN2871
Label Codes : 6.1
Packing Group : III
Marine Pollutant : Marine pollutant
ERG Number : 170



14.2 In Accordance with IMDG

Proper Shipping Name : ANTIMONY POWDER
Hazard Class : 6.1
Identification Number : UN2871
Packing Group : III
Label Codes : 6.1
EmS-No. (Fire) : F-A
EmS-No. (Spillage) : S-A
MFAG Number : 171



14.3 In Accordance with IATA

Proper Shipping Name : ANTIMONY POWDER
Packing Group : III
Identification Number : UN2871
Hazard Class : 6
Label Codes : 6.1
ERG Code (IATA) : 6L



SECTION 15: REGULATORY INFORMATION

15.1 US Federal Regulations

Antimony	
SARA Section 311/312 Hazard Classes	Delayed (chronic) health hazard Immediate (acute) health hazard

Antimony (7440-36-0)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory	
Listed on SARA Section 313 (Specific toxic chemical listings)	
SARA Section 313 - Emission Reporting	1.0 %

15.2 US State Regulations

Antimony (7440-36-0)
U.S. - California - Priority Toxic Pollutants - Human Health Criteria
U.S. - California - Toxic Air Contaminant List (AB 1807, AB 2728)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Level Goals (MCLGs)
U.S. - Colorado - Primary Drinking Water Regulations - Maximum Contaminant Levels (MCLs)
U.S. - Connecticut - Drinking Water Quality Standards - Maximum Contaminant Levels
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (30 min)
U.S. - Connecticut - Hazardous Air Pollutants - HLVs (8 hr)
U.S. - Connecticut - Water Quality Standards - Consumption of Organisms Only
U.S. - Connecticut - Water Quality Standards - Consumption of Water and Organisms
U.S. - Connecticut - Water Quality Standards - Health Designations
U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Florida - Drinking Water Standards - Inorganic Contaminants - Maximum Contaminant Levels (MCLs)
U.S. - Georgia - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Emission Levels (ELs)
U.S. - Idaho - Occupational Exposure Limits - TWAs

U.S. - Illinois - Toxic Air Contaminants
U.S. - Louisiana - Reportable Quantity List for Pollutants
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Maryland - Surface Water Quality Standards - Consumption of Organisms Only
U.S. - Maryland - Surface Water Quality Standards - Consumption of Water and Organisms
U.S. - Massachusetts - Allowable Ambient Limits (AALs)
U.S. - Massachusetts - Allowable Threshold Concentrations (ATCs)
U.S. - Massachusetts - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Groundwater Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Oil & Hazardous Material List - Reportable Quantity
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 1
U.S. - Massachusetts - Oil & Hazardous Material List - Soil Reportable Concentration - Reporting Category 2
U.S. - Massachusetts - Right To Know List
U.S. - Massachusetts - Threshold Effects Exposure Limits (TELs)
U.S. - Massachusetts - Toxics Use Reduction Act
U.S. - Michigan - Occupational Exposure Limits - TWAs
U.S. - Michigan - Polluting Materials List
U.S. - Minnesota - Chemicals of High Concern
U.S. - Minnesota - Groundwater Health Risk Limits
U.S. - Minnesota - Hazardous Substance List
U.S. - Minnesota - Permissible Exposure Limits - TWAs
U.S. - Missouri - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Nebraska - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - 24-Hour
U.S. - New Hampshire - Regulated Toxic Air Pollutants - Ambient Air Levels (AALs) - Annual
U.S. - New Jersey - Discharge Prevention - List of Hazardous Substances
U.S. - New Jersey - Environmental Hazardous Substances List
U.S. - New Jersey - Primary Drinking Water Standards - Maximum Contaminant Levels - MCLs
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New Jersey - Water Quality - Ground Water Quality Criteria
U.S. - New Jersey - Water Quality - Practical Quantitation Levels (PQLs)
U.S. - New York - Occupational Exposure Limits - TWAs
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - North Dakota - Air Pollutants - Guideline Concentrations - 8-Hour
U.S. - North Dakota - Water Quality Standards - Human Health Value for Class III
U.S. - North Dakota - Water Quality Standards - Human Health Value for Classes I, IA, II
U.S. - Oregon - Permissible Exposure Limits - TWAs
U.S. - Pennsylvania - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Pennsylvania - RTK (Right to Know) - Environmental Hazard List
U.S. - Pennsylvania - RTK (Right to Know) List
U.S. - Rhode Island - Air Toxics - Acceptable Ambient Levels - 24-Hour
U.S. - Rhode Island - Water Quality Standards - Acute Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Chronic Freshwater Aquatic Life Criteria
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Aquatic Organisms Only
U.S. - Rhode Island - Water Quality Standards - Human Health Criteria for Consumption of Water and Aquatic Organisms
U.S. - South Carolina - Maximum Contaminant Levels (MCLs)
U.S. - Tennessee - Occupational Exposure Limits - TWAs
U.S. - Texas - Drinking Water Standards - Maximum Contaminant Levels (MCLs)
U.S. - Texas - Effects Screening Levels - Long Term
U.S. - Texas - Effects Screening Levels - Short Term
U.S. - Utah - Drinking Water - Maximum Contaminant Levels (MCLs)
U.S. - Vermont - Hazardous Waste - Hazardous Constituents
U.S. - Vermont - Permissible Exposure Limits - TWAs
U.S. - Virginia - Water Quality Standards - Public Water Supply Effluent Limits
U.S. - Virginia - Water Quality Standards - Surface Waters Not Used for the Public Water Supply Effluent Limits

U.S. - Washington - Dangerous Waste - Dangerous Waste Constituents List
U.S. - Washington - Permissible Exposure Limits - STELs
U.S. - Washington - Permissible Exposure Limits - TWAs
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 25 Feet to Less Than 40 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 40 Feet to Less Than 75 Feet
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights 75 Feet or Greater
U.S. - Wisconsin - Hazardous Air Contaminants - All Sources - Emissions From Stack Heights Less Than 25 Feet

SECTION 16: OTHER INFORMATION

Revision date : 02/12/2014

Other Information : This document has been prepared in accordance with the SDS requirements of the OSHA Hazard Communication Standard 29 CFR 1910.1200.

GHS Full Text Phrases:

Acute Tox. 3 (Oral)	Acute toxicity (oral) Category 3
Acute Tox. 4 (Inhalation)	Acute toxicity (inhalation) Category 4
Acute Tox. 4 (Inhalation:dust,mist)	Acute toxicity (inhalation:dust,mist) Category 4
Aquatic Acute 2	Hazardous to the aquatic environment - Acute Hazard Category 2
Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Carc. 2	Carcinogenicity Category 2
Comb. Dust	Combustible Dust
	May form combustible dust concentrations in air
H301	Toxic if swallowed
H332	Harmful if inhaled
H351	Suspected of causing cancer
H401	Toxic to aquatic life
H411	Toxic to aquatic life with long lasting effects

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.

SDS US (GHS HazCom) - US

SAFETY DATA SHEET

Version 5.2
Revision Date 02/27/2015
Print Date 05/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Aroclor 1254

Product Number : 48586
Brand : Supelco
Index-No. : 602-039-00-4

CAS-No. : 11097-69-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.

P314	Get medical advice/ attention if you feel unwell.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

CAS-No. : 11097-69-1
Index-No. : 602-039-00-4

Hazardous components

Component	Classification	Concentration
Aroclor 1254		
	Acute Tox. 4; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Aroclor 1254	11097-69-1	TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation		
		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Liver damage Chloracne Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Liver damage Chloracne Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		Skin notation		
		TWA	0.001000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition	No data available

temperature

r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,010 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Rat
Liver
Unscheduled DNA synthesis

Rat
Liver
DNA damage

Mouse
fibroblast
Morphological transformation.

Rat
Morphological transformation.

Rat
DNA damage

Rat
DNA damage

Carcinogenicity

Carcinogenicity - Rat - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal:Tumors.

Carcinogenicity - Rat - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Liver:Tumors.

Carcinogenicity - Mouse - Skin
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.
Tumorigenic:Tumors at site or application.

Carcinogenicity - Rat - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Gastrointestinal:Tumors.

Carcinogenicity - Mouse - Oral
Tumorigenic:Neoplastic by RTECS criteria. Liver:Tumors.

Carcinogenicity - Mouse - Intraperitoneal
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic Effects: Uterine tumors. Lungs, Thorax, or Respiration:Tumors.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

Reproductive toxicity - Rabbit - Oral
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Effects on Fertility: Abortion. Effects on Embryo or Fetus: Fetal death.

Reproductive toxicity - Rabbit - Oral
Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Behavioral.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Delayed effects.

Reproductive toxicity - Rat - Intraperitoneal
Maternal Effects: Other effects. Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Mouse - Oral
Effects on Newborn: Behavioral.

Reproductive toxicity - Mammal - Oral
Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated).

No data available

Developmental Toxicity - Rat - Oral

Specific Developmental Abnormalities: Hepatobiliary system.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.22 µg/l - 96.0 h
Toxicity to algae	LC50 - Algae - 0.015 mg/l - 28 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Pimephales promelas (fathead minnow) - 8 Months - 1.8 µg/l
	Bioconcentration factor (BCF): 238,000

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2315 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, liquid
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2315 Class: 9 Packing group: II EMS-No: F-A, S-A

Proper shipping name: POLYCHLORINATED BIPHENYLS, LIQUID
Marine pollutant: yes

IATA

UN number: 2315 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, liquid

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Aroclor 1254	11097-69-1	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Aroclor 1254	11097-69-1	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Aroclor 1254	11097-69-1	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Aroclor 1254	CAS-No. 11097-69-1	Revision Date 1990-06-30
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Aroclor 1254	CAS-No. 11097-69-1	Revision Date 1990-06-30

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H373	May cause damage to organs through prolonged or repeated exposure.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
STOT RE	Specific target organ toxicity - repeated exposure

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.2 Revision Date: 02/27/2015 Print Date: 05/01/2016

SAFETY DATA SHEET

Version 5.3
Revision Date 06/25/2015
Print Date 05/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : AROCLOR 1260

Product Number : CRM48736
Brand : Supelco

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H350 May cause cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Hazardous components

Component		Classification	Concentration
Distillates (petroleum), hydrotreated middle			
CAS-No. EC-No. Index-No.	64742-46-7 265-148-2 649-221-00-X	Carc. 1B; H350	>= 90 - <= 100 %
Baseoil - unspecified			
CAS-No. EC-No. Index-No.	64742-53-6 265-156-6 649-466-00-2	Carc. 1B; H350	>= 30 - < 50 %
2,6-di-tert-Butyl-p-cresol			
CAS-No. EC-No.	128-37-0 204-881-4	Aquatic Acute 1; Aquatic Chronic 1; H410	>= 0.1 - < 1 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Distillates (petroleum), hydrotreated middle	64742-46-7	TWA	500.000000 ppm 2,000.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	The value in mg/m3 is approximate.		

		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	5 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10 mg/m3	USA. NIOSH Recommended Exposure Limits
Baseoil - unspecified	64742-53-6	TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (2,6-di-tert-Butyl-p-cresol)
IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (Distillates (petroleum), hydrotreated middle)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Nerves. - (Aroclor 1260)

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Distillates (petroleum), hydrotreated middle	64742-46-7	1989-08-11
Baseoil - unspecified	64742-53-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Distillates (petroleum), hydrotreated middle	64742-46-7	1989-08-11
Baseoil - unspecified	64742-53-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Distillates (petroleum), hydrotreated middle	64742-46-7	1989-08-11
Baseoil - unspecified	64742-53-6	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Aroclor 1260	11096-82-5	2008-08-01
Distillates (petroleum), hydrotreated middle	64742-46-7	2013-12-20

WARNING: This product contains a chemical known to the	CAS-No.	Revision Date

State of California to cause birth defects or other reproductive harm.	11096-82-5	2008-08-01
Aroclor 1260		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3 Revision Date: 06/25/2015 Print Date: 05/11/2016

SAFETY DATA SHEET

Version 6.10
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Arsenic

Product Number : 202657
Brand : Aldrich
Index-No. : 033-001-00-X
CAS-No. : 7440-38-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Skin irritation (Category 2), H315

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operates as MilliporeSigma in the US and Canada

Serious eye damage (Category 1), H318
Carcinogenicity (Category 1A), H350
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word	Danger
Hazard Statements	
H301 + H331	Toxic if swallowed or if inhaled.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary Statements	
P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	As
Molecular weight	:	74.92 g/mol
CAS-No.	:	7440-38-2
EC-No.	:	231-148-6
Index-No.	:	033-001-00-X

Component	Classification	Concentration
arsenic		
	Acute Tox. 3; Skin Irrit. 2; Eye Dam. 1; Carc. 1A; Aquatic Acute 1; Aquatic Chronic 1; H301, H331, H315, H318, H350, H400, H410 M-Factor - Aquatic Acute: 10 M-Factor - Aquatic Chronic: 1	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible.

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4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Nature of decomposition products not known.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
arsenic	7440-38-2	TWA	0.01 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Lung cancer Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed human carcinogen		
		C	0.0020 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A 15 minute ceiling value		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
arsenic	7440-38-2	inorganic arsenic plus methylated metabolites	15µg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)

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	Remarks	End of shift			
		inorganic arsenic plus methylated metabolites	15µg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of the workweek (After four or five consecutive working days with exposure)			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

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Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Color: gray
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 817 °C (1503 °F) - lit.
f)	Initial boiling point and boiling range	613 °C 1135 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	5.727 g/mL at 25 °C (77 °F) - lit.
	Relative density	5.622.4 °C - OECD Test Guideline 109
n)	Water solubility	ca.0.0106 g/l at 20 °C (68 °F) - OECD Test Guideline 105 - slightly soluble
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	> 430 °C (> 806 °F)does not ignite
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Exothermic reaction with:
Aluminum
Bromine
bromates
chlorates
iodates
Nitric acid
Risk of ignition or formation of inflammable gases or vapours with:
nitrates
Alkali metals
Zinc
Reducing agents
Strong oxidizing agents
Risk of explosion with:
potassium permanganate
azides
halogen-halogen compounds
Peroxides
nitrogen trichloride

10.4 Conditions to avoid
Heat. Exposure to air may affect product quality.
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - 145 mg/kg
Remarks: Behavioral:Ataxia.
Diarrhea
(RTECS)
Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

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Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - In vitro study
Result: Irritating to skin. - 15 min
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes serious eye damage. - 24 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli
Result: negative
Remarks: (ECHA)

Carcinogenicity
May cause cancer. Positive evidence from human epidemiological studies.

IARC:	1 - Group 1: Carcinogenic to humans (arsenic)
NTP:	Known - Known to be human carcinogen (arsenic)
OSHA:	OSHA specifically regulated carcinogen (arsenic)

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: CG0525000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

The following applies to arsenic and its compounds in general: they take effect as capillary and enzyme toxins. Symptoms of arsenic poisoning: acute: after inhalation, mucosal irritations with coughing, dyspnoea, pain in the thorax. Perforations within the respiratory tract are possible. After oral uptake, gastrointestinal disorders with vomiting, diarrhoea, and spasms, CNS disorders with headache, confusion, shaking fits and disturbed consciousness, cardiovascular disorders all the way to circulatory collapse. Chronic: exanthema, dermal lesions in the form of hyperkeratosis and hypermelanosis, loss of hair,

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conjunctivitis and polyneuropathy, impaired hepatic function, and renal damage. After accumulation in the liver, kidneys, and skin, arsenic is eliminated from the organism only slowly. Experience has shown arsenic compounds to be carcinogenic in man.

Other dangerous properties can not be excluded.

This substance should be handled with particular care.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Oreochromis mossambicus (Mozambique tilapia) - 28.68 mg/l - 96 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Bosmina longirostris (water flea) - 0.85 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test NOEC - Macrocystis pyrifera (brown algae) - 0.04 mg/l - 42 h Remarks: (ECHA)
Toxicity to bacteria	static test EC50 - activated sludge - 10.6 mg/l - 10 Days Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Pimephales promelas (fathead minnow) - 2.13 mg/l - 35 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	flow-through test NOEC - Shrimp - 0.631 mg/l - 51 d Remarks: (ECHA)

12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

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12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 1558 Class: 6.1 Packing group: II
Proper shipping name: Arsenic
Reportable Quantity (RQ): 1 lbs
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 1558 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: ARSENIC
Marine pollutant : yes

IATA

UN number: 1558 Class: 6.1 Packing group: II
Proper shipping name: Arsenic

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
arsenic	7440-38-2	1	1
arsenic	7440-38-2	1	1 (D004)

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SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards	:	Acute Health Hazard Chronic Health Hazard
SARA 313	:	The following components are subject to reporting levels established by SARA Title III, Section 313:

arsenic	7440-38-2	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

arsenic	7440-38-2

Pennsylvania Right To Know

arsenic	7440-38-2

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

arsenic	7440-38-2

Washington Chemicals of High Concern

arsenic	7440-38-2

California Prop. 65

WARNING: This product can expose you to chemicals including arsenic, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA	:	All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact

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Version: 6.10 Revision Date: 09/06/2024 Print Date: 09/07/2024

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SAFETY DATA SHEET

Version 4.5
Revision Date 03/02/2015
Print Date 05/24/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Barium

Product Number : 237094
Brand : Aldrich

CAS-No. : 7440-39-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 2), H261
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H261 In contact with water releases flammable gases.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

Precautionary statement(s)
P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232 Handle under inert gas. Protect from moisture.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P271 Use only outdoors or in a well-ventilated area.

P280	Wear protective gloves/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Ba
Molecular weight	:	137.33 g/mol
CAS-No.	:	7440-39-3
EC-No.	:	231-149-1

Hazardous components

Component	Classification	Concentration
Barium		
	Water-react. 2; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; H261, H315, H319, H335	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Barium oxide

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Store under inert gas.
Storage class (TRGS 510): Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Barium	7440-39-3	TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye, skin, & Gastrointestinal irritation Muscular stimulation Not classifiable as a human carcinogen		

		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Eye irritation Muscular stimulation Skin irritation Gastrointestinal irritation Not classifiable as a human carcinogen		
		TWA	0.500000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance Form: Rods

		Colour: grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 725 °C (1,337 °F) - lit.
f)	Initial boiling point and boiling range	1,640 °C (2,984 °F) - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	3.6 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Oxidizing agents, Water, acids, Oxygen, Chlorinated solvents, Carbon dioxide (CO2), Halogens, Halogenated hydrocarbon, Alcohols, Sulphur compounds, Hydrogen sulfide gas

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CQ8370000

Stomach/intestinal disorders, Nausea, Vomiting, Drowsiness, Dizziness, Gastrointestinal disturbance, Weakness, Tremors, Seizures.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality NOEC - Cyprinodon variegatus (sheepshead minnow) - 500 mg/l - 96 h
	LC50 - Cyprinodon variegatus (sheepshead minnow) - > 500 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1400 Class: 4.3 Packing group: II EMS-No: F-G, S-O
Proper shipping name: BARIUM

IATA
UN number: 1400 Class: 4.3 Packing group: II
Proper shipping name: Barium

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Barium	7440-39-3	2007-07-01

SARA 311/312 Hazards
Reactivity Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Barium	7440-39-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date

Barium	7440-39-3	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Eye Irrit.	Eye irritation
H261	In contact with water releases flammable gases.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	1
Special hazard.I:	W

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.5 Revision Date: 03/02/2015 Print Date: 05/24/2016

SAFETY DATA SHEET

Benzene

Section 1. Identification

GHS product identifier : Benzene

Chemical name : benzene

Other means of identification : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

Product use : Synthetic/Analytical chemistry.

Synonym : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

SDS # : 001062

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE LIQUIDS - Category 2
SKIN CORROSION/IRRITATION - Category 2
SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2
GERM CELL MUTAGENICITY - Category 1B
CARCINOGENICITY - Category 1
SPECIFIC TARGET ORGAN TOXICITY (REPEATED EXPOSURE) (bone marrow) - Category 1

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Highly flammable liquid and vapor.
May form explosive mixtures with air.
Causes serious eye irritation.
Causes skin irritation.
May cause genetic defects.
May cause cancer.
Causes damage to organs through prolonged or repeated exposure. (bone marrow)

Precautionary statements

General : Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand.

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Section 2. Hazards identification

Prevention : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Wear protective gloves. Wear eye or face protection. Keep away from heat, sparks, open flames and hot surfaces. - No smoking. Use explosion-proof electrical, ventilating, lighting and all material-handling equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Keep container tightly closed. Do not breathe vapor. Do not eat, drink or smoke when using this product. Wash hands thoroughly after handling.

Response : Get medical attention if you feel unwell. IF exposed or concerned: Get medical attention. IF SWALLOWED: Call a POISON CENTER or physician if you feel unwell. Rinse mouth. IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower. IF ON SKIN: Wash with plenty of soap and water. Take off contaminated clothing. If skin irritation occurs: Get medical attention. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical attention.

Storage : Store locked up. Store in a well-ventilated place. Keep cool.

Disposal : Dispose of contents and container in accordance with all local, regional, national and international regulations.

Hazards not otherwise classified : None known.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : benzene

Other means of identification : benzene, purebenzol; cyclohexatriene; phenyl hydride; phene; coal naphtha; pyrobenzol

CAS number/other identifiers

CAS number : 71-43-2

Product code : 001062

Ingredient name	%	CAS number
benzene	100	71-43-2

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

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Section 4. First aid measures

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Get medical attention. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Get medical attention. If necessary, call a poison center or physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

Skin contact : Causes skin irritation.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

See toxicological information (Section 11)

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Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use dry chemical, CO_2, water spray (fog) or foam.

Unsuitable extinguishing media : Do not use water jet.

Specific hazards arising from the chemical : Highly flammable liquid and vapor. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion. The vapor/gas is heavier than air and will spread along the ground. Vapors may accumulate in low or confined areas or travel a considerable distance to a source of ignition and flash back. Runoff to sewer may create fire or explosion hazard.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Large spill : Stop leak if without risk. Move containers from spill area. Use spark-proof tools and explosion-proof equipment. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Avoid exposure - obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Use only non-sparking tools. Take precautionary measures against electrostatic discharges. Empty containers retain product residue and can be hazardous. Do not reuse container.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Store locked up. Eliminate all ignition sources. Separate from oxidizing materials. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
benzene	**ACGIH TLV (United States, 3/2012).** **Absorbed through skin.** STEL: 8 mg/m³ 15 minutes. STEL: 2.5 ppm 15 minutes. TWA: 1.6 mg/m³ 8 hours. TWA: 0.5 ppm 8 hours. **NIOSH REL (United States, 1/2013).** STEL: 1 ppm 15 minutes. TWA: 0.1 ppm 10 hours. **OSHA PEL (United States, 6/2010).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** STEL: 5 ppm 15 minutes. TWA: 1 ppm 8 hours. **OSHA PEL Z2 (United States, 11/2006).** AMP: 50 ppm 10 minutes. CEIL: 25 ppm TWA: 10 ppm 8 hours.

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Section 8. Exposure controls/personal protection

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Liquid. [Watery liquid.]

Color : Colorless. Yellowish.

Molecular weight : 78.12 g/mole

Molecular formula : C6-H6

Boiling/condensation point : 80.09°C (176.2°F)

Melting/freezing point : 5.49°C (41.9°F)

Critical temperature : 288.95°C (552.1°F)

Odor : Characteristic.

Odor threshold : Not available.

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Section 9. Physical and chemical properties

pH	:	Not available.
Flash point	:	Closed cup: -11°C (12.2°F)
Burning time	:	Not applicable.
Burning rate	:	Not applicable.
Evaporation rate	:	3.5 (butyl acetate = 1)
Flammability (solid, gas)	:	Not available.
Lower and upper explosive (flammable) limits	:	Lower: 1.2% Upper: 7.8%
Vapor pressure	:	10 kPa (75.006094245 mm Hg) [room temperature]
Vapor density	:	2.7 (Air = 1)
Specific Volume (ft^3/lb)	:	1.1403
Gas Density (lb/ft^3)	:	0.877 (20°C / 68 to °F)
Relative density	:	0.88
Solubility	:	Not available.
Solubility in water	:	1.88 g/l
Partition coefficient: n-octanol/water	:	2.13
Auto-ignition temperature	:	498°C (928.4°F)
Decomposition temperature	:	Not available.
SADT	:	Not available.
Viscosity	:	Dynamic (room temperature): 0.604 mPa·s (0.604 cP)

Section 10. Stability and reactivity

Reactivity	:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	:	The product is stable.
Possibility of hazardous reactions	:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid	:	Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition. Do not allow vapor to accumulate in low or confined areas.
Incompatibility with various substances	:	Highly reactive or incompatible with the following materials: oxidizing materials.
Hazardous decomposition products	:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Hazardous polymerization	:	Under normal conditions of storage and use, hazardous polymerization will not occur.

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Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
benzene	LC50 Inhalation Gas. LD50 Oral	Rat Rat	10000 ppm 930 mg/kg	7 hours -

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
benzene	Eyes - Moderate irritant Eyes - Severe irritant Skin - Mild irritant Skin - Mild irritant Skin - Moderate irritant	Rabbit Rabbit Rat Rabbit Rabbit	- - - - -	88 milligrams 24 hours 2 milligrams 8 hours 60 microliters 24 hours 15 milligrams 24 hours 20 milligrams	- - - - -

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Classification

Product/ingredient name	OSHA	IARC	NTP
benzene	+	1	Known to be a human carcinogen.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Name	Category	Route of exposure	Target organs
benzene	Category 1	Not determined	bone marrow

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Causes serious eye irritation.

Inhalation : No known significant effects or critical hazards.

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Section 11. Toxicological information

Skin contact : Causes skin irritation.

Ingestion : Harmful if swallowed. Irritating to mouth, throat and stomach.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
pain or irritation
watering
redness

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
irritation
redness

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : Causes damage to organs through prolonged or repeated exposure.

Carcinogenicity : May cause cancer. Risk of cancer depends on duration and level of exposure.

Mutagenicity : May cause genetic defects.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

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Section 12. Ecological information

Product/ingredient name	$LogP_{ow}$	BCF	Potential
benzene	2.13	11	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Vapor from product residues may create a highly flammable or explosive atmosphere inside the container. Do not cut, weld or grind used containers unless they have been cleaned thoroughly internally. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Benzene (I,T)	71-43-2	Listed	U019

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1114	UN1114	UN114	UN1114	UN1114
UN proper shipping name	BENZENE	BENZENE	BENZENE	BENZENE	BENZENE
Transport hazard class(es)	3 	3 	3 	3 	3 
Packing group	II	II	II	II	II
Environment	No.	No.	No.	No.	No.
Additional information	**Reportable quantity** 10 lbs / 4.54 kg [1.3675 gal / 5.1767 L] Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements.	**Explosive Limit and Limited Quantity Index** 1 **Passenger Carrying Road or Rail Index** 5	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 5 L **Cargo Aircraft Only** Quantity limitation: 60 L **Limited Quantities - Passenger Aircraft** Quantity limitation: 1 L

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Section 14. Transport information

	Limited quantity Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 5 L **Cargo aircraft** Quantity limitation: 60 L **Special provisions** IB2, T4, TP1				

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Water Act (CWA) 307: benzene

Clean Water Act (CWA) 311: benzene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Fire hazard
Immediate (acute) health hazard
Delayed (chronic) health hazard

Composition/information on ingredients

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Section 15. Regulatory information

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
benzene	100	Yes.	No.	No.	Yes.	Yes.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	benzene	71-43-2	100
Supplier notification	benzene	71-43-2	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

California Prop. 65

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

Ingredient name	Cancer	Reproductive	No significant risk level	Maximum acceptable dosage level
benzene	Yes.	Yes.	6.4 µg/day (ingestion) 13 µg/day (inhalation)	24 µg/day (ingestion) 49 µg/day (inhalation)

Canada inventory : This material is listed or exempted.

International regulations

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

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Section 15. Regulatory information

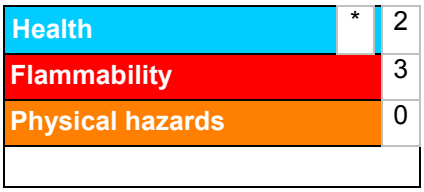
WHMIS (Canada) : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class B-2: Flammable liquid
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 4/26/2015.

Date of issue/Date of revision : 4/26/2015.

Date of previous issue : 10/16/2014.

Version : 0.03

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Section 16. Other information

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Version 4.8
Revision Date 06/02/2016
Print Date 11/14/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Benzidine

Product Number : B3503
Brand : Sigma
Index-No. : 612-042-00-2

CAS-No. : 92-87-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Carcinogenicity (Category 1A), H350
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H302 Harmful if swallowed.
H350 May cause cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 4,4′-Diaminobiphenyl

Formula : $C_{12}H_{12}N_2$
Molecular weight : 184.24 g/mol
CAS-No. : 92-87-5
EC-No. : 202-199-1
Index-No. : 612-042-00-2

Hazardous components

Component	Classification	Concentration
Benzidine		
	Acute Tox. 4; Carc. 1A; Aquatic Acute 1; Aquatic Chronic 1; H302, H350, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Light sensitive. Keep in a dry place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

	Remarks	Potential Occupational Carcinogen Benzidine has been used as a basis for many dyes. See Appendix C See Appendix A
		Bladder cancer Exposure by all routes should be carefully controlled to levels as low as possible. Confirmed human carcinogen Danger of cutaneous absorption
		Bladder cancer Exposure by all routes should be carefully controlled to levels as low as possible. Confirmed human carcinogen Danger of cutaneous absorption
		Substance listed; for more information see OSHA document 1910.1010
		1910.1003 1910.1010

		This section shall not apply to solid or liquid mixtures containing less than 0.1 percent by weight or volume This section applies to any area in which this substance is manufactured, processed, repackaged, released, handled, or stored, but shall not apply to transshipment in sealed containers, except for the labeling requirements under paragraphs (e)(2), (3) and (4) of this section. OSHA specifically regulated carcinogen
		Potential Occupational Carcinogen Benzidine has been used as a basis for many dyes. See Appendix C See Appendix A
		1910.1003 1910.1010 This section shall not apply to solid or liquid mixtures containing less than 0.1 percent by weight or volume This section applies to any area in which this substance is manufactured, processed, repackaged, released, handled, or stored, but shall not apply to transshipment in sealed containers, except for the labeling requirements under paragraphs (e)(2), (3) and (4) of this section. OSHA specifically regulated carcinogen
		Substance listed; for more information see OSHA document 1910.1010
		Skin see Section 5209

Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 127 °C (261 °F)
f)	Initial boiling point and boiling range	400 °C (752 °F) at 1,013 hPa (760 mmHg)
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.250 g/cm3 at 20 °C (68 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 1.34log Pow: 5
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 309 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Repeated absorption may result in bladder tumors. This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Human carcinogen.

IARC:	1 - Group 1: Carcinogenic to humans (Benzidine)
NTP:	Known to be human carcinogen (Benzidine)
OSHA:	OSHA specifically regulated carcinogen (Benzidine)

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: DC9625000

Liver injury may occur., Kidney injury may occur., Blood disorders, Nausea, Vomiting

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 7.4 mg/l - 96.0 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Leuciscus idus (Golden orfe) - 3 d - 50 µg/l
	Bioconcentration factor (BCF): 83

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1885 Class: 6.1 Packing group: II
Proper shipping name: Benzidine
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1885 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: BENZIDINE
Marine pollutant:yes

IATA
UN number: 1885 Class: 6.1 Packing group: II
Proper shipping name: Benzidine

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Benzidine	92-87-5	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Benzidine	92-87-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Benzidine	92-87-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Benzidine	92-87-5	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Benzidine	CAS-No. 92-87-5	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.8 Revision Date: 06/02/2016 Print Date: 11/14/2016

SAFETY DATA SHEET

Based on Directive 2001/58/EC et seq. of the Commission of the European Communities

BENZ[a]ANTHRACENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: benzo(a)anthracene

CAS No.	: 56-55-3	**BCR number**	: BCR-271
EC index No.	: 601-033-00-9	**NFPA code**	: N.D.
EINECS No.	: 200-280-6	**Molecular weight**	: 228.30
RTECS No.	: CV9275000	**Formula**	: C18H12

1.2 Use of the substance or the preparation:
Certified reference material for laboratory use only

1.3 Company/undertaking identification:
Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
Benzo[a]anthracene	56-55-3 200-280-6	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:
- Consult a doctor/medical service if irritation persists
- Rinse immediately with water

4.2 Skin contact:
- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Remove clothing before washing

4.3 After inhalation:
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:
- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink
- Never give water to an unconscious person

5. Fire-fighting measures

5.1 Suitable extinguishing media:
- Water spray
- Alcohol foam
- Polymer foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:
- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:
- Not easily combustible
- Upon combustion CO and CO2 are formed

5.4 Instructions:
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal protection/precautions: see heading 8.1/8.3/10.3

6.2 Environmental precautions:
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

6.3 Methods for cleaning up:
- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:
- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately

7.2 Storage:
- Keep container tightly closed. Store in a cool area. Store in a dry area.
- Store in a dark area.
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

Storage temperature : N.D. **°C**
Quantity limits : N.D. **kg**
Storage life : N.D.
Materials for packaging :
- suitable : no data available

- to avoid : no data available

7.3 Specific uses:
See information supplied by the manufacturer

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA	:	**mg/m³**	-	**ppm**
TLV-STEL	:	**mg/m³**	-	**ppm**
TLV-Ceiling	:	**mg/m³**		**ppm**
OES-LTEL	:	**mg/m³**		**ppm**
OES-STEL	:	**mg/m³**		**ppm**
MAK	:	**mg/m³**		**ppm**
TRK	:	**mg/m³**		**ppm**
MAC-TGG 8 h	:	**mg/m³**		
MAC-TGG 15 min.	:	**mg/m³**		
MAC-Ceiling	:	**mg/m³**		
VME-8 h	:	**mg/m³**		**ppm**
VLE-15 min.	:	**mg/m³**		**ppm**
GWBB-8 h	:	**mg/m³**		**ppm**
GWK-15 min.	:	**mg/m³**		**ppm**
Momentary value	:	**mg/m³**		**ppm**
EC	:	**mg/m³**		**ppm**
EC-STEL	:	**mg/m³**		**ppm**

Sampling methods:

-	Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH 5506
-	Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH 5515
-	Benz(a)Anthracene	OSHA CSI

8.2 Exposure controls:

8.2.1 Occupational exposure controls:
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see heading 13

8.3 Personal protection:

8.3.1 respiratory protection:
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:
- Gloves
  Suitable materials: No data available

- Breakthrough time: N.D.

8.3.3 eye protection:
- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	:	Crystalline solid / Scales
Odour	:	Odourless
Colour	:	Colourless to fluorescent yellow-green

9.2 Important health, safety and environmental information:

pH value	:	N.D.	
Boiling point/boiling range	:	N.A.	**°C**
Flashpoint	:	N.D.	**°C**
Explosion limits	:	N.D.	**vol%** (**°C**)
Vapour pressure (at 20°C)	:	0.00007	**hPa**
Vapour pressure (at 50°C)	:	N.D.	**hPa**
Relative density (at 20°C)	:	1.3	
Water solubility	:	0.00001	**g/100 ml**
Soluble in	:	Ether, acetone, oils/fats	
Relative vapour density	:	N.D.	
Viscosity	:	N.D.	**Pa.s**
Partition coëfficient n-octanol/water	:	5.61/5.79	
Evaporation rate			
ratio to butyl acetate	:	N.D.	
ratio to ether	:	N.D.	

9.3 Other information:

Melting point/melting range	:	160	**°C**
Auto-ignition point	:	N.D.	**°C**
Saturation concentration	:	N.D.	**g/m^3**

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:
- Stable under normal conditions

10.2 Materials to avoid:
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	:	N.D.	**mg/kg**
LD50 dermal rat	:	N.D.	**mg/kg**
LD50 dermal rabbit	:	N.D.	**mg/kg**
LC50 inhalation rat	:	N.D.	**mg/l/4 h**
LC50 inhalation rat	:	N.D.	**ppm/4 h**

11.2 Chronic toxicity:

EC carc. cat.	:	2
EC muta. cat.	:	not listed
EC repr. cat.	:	not listed
Carcinogenicity (TLV)	:	A2
Carcinogenicity (MAC)	:	K
Carcinogenicity (VME)	:	not listed
Carcinogenicity (GWBB)	:	not listed
Carcinogenicity (MAK)	:	2
Mutagenicity (MAK)	:	not listed
Teratogenicity (MAK)	:	-
IARC classification	:	2A

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

AFTER SKIN CONTACT
- Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- Mutagenicity: AMES test positive
- Probably human mutagenic

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- No specific information available

SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
- Feeling of weakness
- Photoallergy
- Skin rash/inflammation
- Cracking of the skin
- Skin cancer
- Lung tissue affection/degeneration
- Enlargement/affection of the liver
- Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

- LC50 (65 h) : 0.0018 mg/l (PIMEPHALES PROMELAS)
- EC50 (96 h) : 0.01 mg/l (DAPHNIA PULEX)

12.2 Mobility:

- **Volatile organic compounds (VOC):** 0%

- Photolysis in water
- Ozonation in water
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- **biodegradation BOD_5** : N.D. **% ThOD**
- **water** : - Not readily biodegradable in water
- **soil** : **T ½:** > 100 **days**

12.4 Bioaccumulative potential:
- **log P_{ow}** : 5.61/5.79
- **BCF** : 72 h : 350 (LEUCISCUS IDUS)
- Highly bioaccumulative

12.5 Other adverse effects:

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

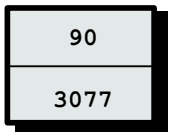
13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council Decision 2455/2001/EC)

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

14. Transport information



14.1 Classification of the substance in compliance with UN Recommendations

UN number	: 3077
CLASS	: 9
SUB RISKS	: -
PACKING	: III
PROPER SHIPPING NAME	: UN 3077, Environmentally hazardous substance, solid, n.o.s. (benzo[a]anthracene)

14.2 ADR (transport by road)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.3 RID (transport by rail)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.4 ADNR (transport by inland waterways)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.5 IMDG (maritime transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
MFAG	: -
EMS	: -
MARINE POLLUTANT	: P

14.6 ICAO (air transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	:
PACKING INSTRUCTIONS CARGO AIRCRAFT	:

14.7 Special precautions in connection with transport : none

14.8 Limited quantities (LQ) :

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Toxic



Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:
TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:
K : List of the carcinogenic substances and processes - The Netherlands 2002

Safety Data Sheet

Revision Date: 03/23/15
www.restek.com

1. IDENTIFICATION

Catalog Number / Product Name:	**31272, 31272-5XX, & 31372 / Benzo (b) Fluoranthene Standard**
Company:	Restek Corporation
Address:	110 Benner Circle Bellefonte, Pa. 16823
Phone#:	814-353-1300
Fax#:	814-353-1309
Emergency#:	1-800-424-9300 (CHEMTREC) +1 703-741-5970 (Outside the US)
Email:	sds@restek.com
Revision Number:	8
Intended use:	For Laboratory use only

2. HAZARD(S)IDENTIFICATION

Emergency Overview:

GHS Hazard Symbols:



GHS Classification:
Flammable Liquid Category 2
Specific Target Organ Systemic Toxicity (STOT) - Single Exposure Category 3

GHS Signal Word:
Danger

GHS Hazard:
Highly flammable liquid and vapour.
May cause drowsiness or dizziness.

GHS Precautions:

Safety Precautions:
Keep away from heat/sparks/open flames/hot surfaces. – No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilation and lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Avoid breathing dust/fume/gas/mist/vapours/spray.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.

First Aid Measures:
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
In case of fire: Use extinguishing media in section 5 for extinction.

Storage:
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.

Disposal:
Dispose of contents/container according to section 13 of the SDS.

Single Exposure Target Organs:
No data available.

Repeated Exposure Target Organs:
No data available.

3. COMPOSITION / INFORMATION ON INGREDIENT

Chemical Name	CAS #	EINEC #	% Composition
Acetone	67-64-1	200-662-2	99.900000
benzo (b) fluoranthene	205-99-2	205-911-9	0.100000

4. FIRST-AID MEASURES

Inhalation: Remove to fresh air. If breathing is difficult, have a trained individual administer oxygen. If not breathing, give artificial respiration and have a trained individual administer oxygen. Get medical attention immediately

Eyes: Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

Skin Contact: Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

Ingestion: Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this SDS.

5. FIRE- FIGHTING MEASURES

Extinguishing Media: Use alcohol resistant foam, carbon dioxide, or dry chemical extinguishing agents. Water spray or fog may also be effective for extinguishing if swept across the base of the fire. Water can also be used to absorb heat and keep exposed material from being damaged by fire. Flammable component(s) of this material may be lighter than water and burn while floating on the surface.

Fire and/or Explosion Hazards: Vapors may be ignited by heat, sparks, flames or other sources of ignition at or above the low flash point giving rise to a Class B fire. Vapors are heavier than air and may travel to a source of ignition and flash back

Fire Fighting Methods and Protection: Do not enter fire area without proper protection including self-contained toxic breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products. Flammable component(s) of this material may be lighter than water and burn while floating on the surface. Use water spray/fog for cooling.

Hazardous Combustion Products: Carbon dioxide, Carbon monoxide

6. ACCIDENTAL RELEASE MEASURES

Personal Precautions and Equipment: Exposure to the spilled material may be irritating or harmful. Follow personal protective equipment recommendations found in Section 8 of this SDS. Additional precautions may be necessary based on special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred. Also consider the expertise of employees in the area responding to the spill.

Methods for Clean-up: Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section 8 at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

7. HANDLING AND STORAGE

Handling Technical Measures and Precautions: Harmful or irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area. Use spark-proof tools and explosion-proof equipment

Storage Technical Measures and Conditions: Store in a cool dry ventilated location. Isolate from incompatible materials and conditions. Keep container(s) closed. Keep away from sources of ignition

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

United States:

Chemical Name	CAS No.	IDLH	ACGIH STEL	ACGIH TLV-TWA	OSHA Exposure Limit
Acetone	67-64-1	2500 ppm IDLH (10% LEL)	750 ppm STEL 750 ppm STEL;	500 ppm TWA 500 ppm TWA; 1188 mg/m3	1000 ppm TWA; 2400 mg/m3 TWA

benzo (b) fluoranthene	205-99-2	ND	1782 mg/m3 STEL TWA No TLV		No data available.

Personal Protection:

Engineering Measures:	Local exhaust ventilation is recommended when generating excessive levels of vapors from handling or thermal processing.
Respiratory Protection:	No respiratory protection required under normal conditions of use. Provide general room exhaust ventilation if symptoms of overexposure occur as explained Section 3. A respirator is not normally required.
Eye Protection:	Wear chemically resistant safety glasses with side shields when handling this product. Do not wear contact lenses.
Skin Protection:	Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work
Medical Conditions Aggravated By Exposure:	Respiratory disease including asthma and bronchitis

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance, color:	Depends upon product selection
Odor:	Strong
Physical State:	No data available.
pH:	No data available
Vapor Density:	2.0 (air = 1)
Melting Point:	-95.4 °C Melting Point
Flash Point:	39
Flammability:	Highly Flammable
Upper Flammable/Explosive Limit, % in air:	No data available.
Lower Flammable/Explosive Limit, % in air:	No data available.
Autoignition Temperature:	465 deg C
Decomposition Temperature:	No data available.
Specific Gravity:	0.7845 g/cm3 at 25 °C
Evaporation Rate:	No data available.
Odor Threshold:	ND
Solubility:	Complete; 100%
Partition Coefficient: n-octanol in water:	No data available.
VOC % by weight:	0.00
Molecular Weight:	58.08

10. STABILITY AND REACTIVITY

Stability:	Stable under normal conditions.
Conditions to Avoid:	No data available.
Materials to Avoid / Chemical Incompatiability:	Strong oxidizing agents Strong acids
Hazardous Decomposition Products:	Carbon dioxide Carbon monoxide

11. TOXICOLOGICAL INFORMATION

Routes of Entry:	Inhalation, Skin Contact, Eye Contact, Ingestion
Target Organs Potentially Affected By Exposure:	Eyes, Central nervous system stimulation, Respiratory Tract, Skin
Chemical Interactions That Change Toxicity:	None Known

Immediate (Acute) Health Effects by Route of Exposure:

Inhalation Irritation:	Can cause minor respiratory irritation, dizziness, weakness, fatigue, nausea, and headache.
Skin Contact:	Can cause minor skin irritation, defatting, and dermatitis.
Eye Contact:	Can cause minor irritation, tearing and reddening.
Ingestion Irritation:	May be harmful if swallowed.
Ingestion Toxicity:	Harmful if swallowed. May cause systemic poisoning.

Long-Term (Chronic) Health Effects:

Carcinogenicity:	Contains a probable or known human carcinogen.
Reproductive and Developmental Toxicity:	No data available to indicate product or any components present at greater than 0.1% may cause birth defects.
Inhalation:	Upon prolonged and/or repeated exposure, can cause minor respiratory irritation, dizziness, weakness, fatigue, nausea, and headache.
Skin Contact:	Upon prolonged or repeated contact, can cause minor

skin irritation, defatting, and dermatitis.

Component Toxicological Data:

NIOSH:

Chemical Name	CAS No.	LD50/LC50
Acetone	67-64-1	Inhalation LC50 Rat 50100 mg/m3 8 h

Component Carcinogenic Data:

OSHA:

Chemical Name	CAS No.	
Benzo(b)fluoranthene	205-99-2	Present

ACGIH:

Chemical Name	CAS No.	
Acetone	67-64-1	A4 - Not Classifiable as a Human Carcinogen
Benzo[b]fluoranthene	205-99-2	A2 - Suspected Human Carcinogen

NIOSH:

Chemical Name	CAS No.
No data available.	

NTP:

Chemical Name	CAS No.
No data available.	

IARC:

Chemical Name	CAS No.	Group No.
No data.		Group 1
No data.		Group 2A
Benzo(b)fluoranthene	205-99-2	Group 2B

12. ECOLOGICAL INFORMATION

Overview:	This material is not expected to be harmful to the ecology.
Mobility:	No data
Persistence:	No data
Bioaccumulation:	No data
Degradability:	No data
Ecological Toxicity Data:	No data available.

13. DISPOSAL CONSIDERATIONS

Waste Description of Spent Product:	Spent or discarded material is a hazardous waste.
Disposal Methods:	Dispose of by incineration following Federal, State, Local, or Provincial regulations.
Waste Disposal of Packaging:	Comply with all Local, State, Federal, and Provincial Environmental Regulations.

14. TRANSPORTATION INFORMATION

United States:

DOT Proper Shipping Name:	Acetone
UN Number:	UN1090
Hazard Class:	3
Packing Group:	II

International:

IATA Proper Shipping Name:	Acetone
UN Number:	UN1090
Hazard Class:	3
Packing Group:	II

Marine Pollutant: No

Chemical Name	CAS#	Marine Pollutant	Severe Marine Pollutant
No data available.			

15. REGULATORY INFORMATION

United States:

Chemical Name	CAS#	CERCLA	SARA 313	SARA EHS 313	TSCA
Acetone	67-64-1	X	-	-	X
benzo (b) fluoranthene	205-99-2	X	X	-	-

The following chemicals are listed on CA Prop 65:

Chemical Name	CAS #	Regulation
Benzo[b]fluoranthene	205-99-2	Prop 65 Cancer

State Right To Know Listing:

Chemical Name	CAS#	New Jersey	Massachusetts	Pennsylvania	California
Acetone	67-64-1	X	X	X	X
benzo (b) fluoranthene	205-99-2	X	X	X	X

16. OTHER INFORMATION

Prior Version Date: 05/16/14

Disclaimer: Restek Corporation provides the descriptions, data and information contained herein in good faith but makes no representation as to its comprehensiveness or accuracy. It is provided for your guidance only. Because many factors may affect processing or application/use, Restek Corporation recommends you perform an assessment to determine the suitability of a product for your particular purpose prior to use. No warranties of any kind, either expressed or implied, including fitness for a particular purpose, are made regarding prodcuts described, data or information set forth. In no case shall the descriptions, information, or data provided be considered a part of our terms and conditions of sale. Further, the descriptions, data and information furnished hereunder are given gratis. No obligation or liability for the description, data and information given are assumed. All such being given and accepted at your risk.

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Benzo[ghi]perylene**

Cat No. : **AC105550000; AC105550050; AC105550250; AC105551000**

Synonyms 1,12-Benzoperylene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Benzo(ghi)perylene	191-24-2	> 98

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Ingestion Clean mouth with water. Get medical attention.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	276 - 280 °C / 528.8 - 536 °F
Boiling Point/Range	No information available > @ 760 mmHg
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C22 H12
Molecular Weight	276.33

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable.
Conditions to Avoid	Excess heat. Exposure to light. Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO_2)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	No acute toxicity information is available for this product
Component Information	
Toxicologically Synergistic	No information available

Products

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Benzo(ghi)perylene	191-24-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Benzo(ghi)perylene	7.23

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL

Benzo(ghi)perylene	-	-	-	205-883-8	-		-	-	-	-	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Benzo(ghi)perylene	191-24-2	> 98	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzo(ghi)perylene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzo(ghi)perylene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo(ghi)perylene	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security

This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

Institute for Reference Materials and Measurements

SAFETY DATA SHEET

Based on Regulation (EC) No. 1907/2006 (REACH) Article 31 and Annex II

BCR-048R: benzo[k]fluoranthene

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Product name: BCR-048R: benzo[k]fluoranthene

CAS number	207-08-9
EC index number	601-036-00-5
EINECS number	205-916-6
RTECS number	DF6350000
Molecular mass	252.32 g/mol
Formula	C20H12

1.2 Use of the substance/preparation:

Certified reference material for laboratory use only

1.3 Company/undertaking identification:

Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel: +32 14 57 12 11
Fax: +32 14 59 04 06
JRC-IRMM-RM-Sales@ec.europa.eu

1.4 Emergency telephone:

Poison Centre: +32 70 245 245

2. Hazards identification

NFPA: 1-1-2(*)

DSD/DPD

May cause cancer

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Other hazards

Its dust is explosive with air

Dust cloud can be ignited by a spark

Slightly irritant to skin

Slightly irritant to eyes

Caution! Substance is absorbed through the skin

No certainty about human mutagenic properties

Highly bioaccumulative

Not readily biodegradable in water

CLP

Carc. 1B	May cause cancer. (H350)
Aquatic Acute 1	Very toxic to aquatic life. (H400)
Aquatic Chronic 1	Very toxic to aquatic life with long lasting effects. (H410)

Other hazards

Its dust is explosive with air

Dust cloud can be ignited by a spark

Slightly irritant to skin

Slightly irritant to eyes

Caution! Substance is absorbed through the skin

No certainty about human mutagenic properties

Highly bioaccumulative

Not readily biodegradable in water

3. Composition/information on ingredients

Name	CAS No EINECS/ELINCS	Conc.	Classification according to DSD/DPD	Classification according to CLP	Note
benzo[k]fluoranthene	207-08-9 205-916-6		Carc. Cat. 2; R45 N; R50-53	Carc. 1B; H350 Aquatic Acute 1; H400 Aquatic Chronic 1; H410	

4. First aid measures

4.1 After inhalation:

Remove the victim into fresh air

Respiratory problems: consult a doctor/medical service

4.2 Skin contact:

Rinse with water

Do not apply (chemical) neutralizing agents

Take victim to a doctor if irritation persists

4.3 Eye contact:

Rinse with water

Do not apply neutralizing agents

Take victim to an ophthalmologist if irritation persists

4.4 After ingestion:

Rinse mouth with water

Immediately after ingestion: give lots of water to drink

Do not induce vomiting

Consult a doctor/medical service if you feel unwell

5. Fire-fighting measures

5.1 Suitable extinguishing media:

Water spray

Polyvalent foam

ABC powder

Carbon dioxide

5.2 Unsuitable extinguishing media:

No unsuitable extinguishing media known

5.3 Special exposure hazards:

Heating increases the fire hazard

Dust cloud can be ignited by a spark

Upon combustion CO and CO2 are formed

5.4 Instructions:

Take account of toxic fire-fighting water

Use water moderately and if possible collect or contain it

5.5 Special protective equipment for fire-fighters:

Gloves

Protective clothing

Heat/fire exposure: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal precautions:

See heading 8.2

6.2 Environmental precautions:

Dam up the solid spill

Prevent soil and water pollution

Prevent spreading in sewers

See heading 13

6.3 Methods for cleaning up:

Scoop solid spill into closing containers
Carefully collect the spill/leftovers
Clean contaminated surfaces with an excess of water
Take collected spill to manufacturer/competent authority
Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:

Avoid raising dust
Warning! Avoid exposure
Keep away from naked flames/heat
Obtain special instructions before use
Observe strict hygiene
Keep container tightly closed
Do not discharge the waste into the drain

7.2 Storage:

Safe storage requirements:

Store in a cool area
Store in a dry area
Keep container in a well-ventilated place
Keep locked up
Unauthorized persons are not admitted
Meet the legal requirements

Keep away from:

oxidizing agents
(strong) acids

7.3 Specific use(s):

See information supplied by the manufacturer for the identified use(s)

8. Exposure controls/Personal protection

8.1 Exposure limit values:

8.1.1 Occupational exposure:

If limit values are applicable and available these will be listed below.

8.1.2 Sampling methods:

Product name	Test	Number	Sampling method	Remarks
Benz(a)Anthracene	OSHA	CSI		
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5506	adsorption tubes	
Benz(a)Anthracene (Polynuclear aromatic hydrocarbons)	NIOSH	5515	adsorption tubes	

8.2 Exposure controls:

8.2.1 Occupational exposure controls:

Measure the concentration in the air regularly
Carry operations in the open/under local exhaust/ventilation or with respiratory protection
Personal protective equipment:

a) Respiratory protection:

Dust production: dust mask with filter type P3

b) Hand protection:

Gloves

c) Eye protection:

Safety glasses
In case of dust production: protective goggles

d) Skin protection:

Protective clothing

8.2.2 Environmental exposure controls:

See headings 6.2, 6.3 and 13

9. Physical and chemical properties

9.1 General information:

Physical form	Crystalline solid
	Needles
Colour	Light yellow

9.2 Important health, safety and environmental information:

Boiling point	480 °C
Vapour pressure (20°C)	< 0.00001 hPa
Solubility in water	< 0.00001 g/100 ml
Solubility in solvents	Soluble in ethanol
	Soluble in acetic acid
	Soluble in oils/fats
Log Pow	6.84

9.3 Other information:

Melting point	217 °C

10. Stability and reactivity

10.1 Conditions to avoid:

Possible fire hazard

heat sources

ignition sources

Stability

No data available

Reactions

Reacts violently with (strong) oxidizers

10.2 Materials to avoid:

oxidizing agents

(strong) acids

10.3 Hazardous decomposition products:

Upon combustion CO and CO2 are formed

11. Toxicological information

11.1 Acute toxicity:

No (test)data available.

11.2 Chronic toxicity:

Probably human carcinogenic

No certainty about human mutagenic properties

Not classified as toxic to reproduction (EC)

BCR-048R: benzo[k]fluoranthene

EC carc cat	2
Listed in SZW - List of carcinogenic substances	yes
IARC - classification	2B
MAK - Krebserzeugend Kategorie	2
MAK - Keimzellmutagen Kategorie	3B
MAK - Schwangerschaft Gruppe	-
CLP carc cat	category 1B

11.3 Acute effects/symptoms:

Inhalation:

No data available

Skin contact:

Slight irritation

Eye contact:

Slight irritation

Ingestion:

No data available

11.4 Chronic effects:

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
No specific information available
SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
Feeling of weakness
Cracking of the skin
Skin rash/inflammation
Photoallergy
Skin cancer
Lung tissue affection/degeneration
Enlargement/affection of the liver
Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

No (test)data available.

12.2 Mobility:

Volatile organic compounds (VOC)	0 %
Solubility in/reaction with water	Insoluble in water
Water physicochemical processes	Forming sediments in water
Soil physicochemical processes	Adsorbs into the soil

12.3 Persistence and degradability:

Water abiotic degradation processes	Ozonation in water
Half-life soil	65 - 1400 days

Not readily biodegradable in water

12.4 Bioaccumulative potential:

Log Pow	6.84

Highly bioaccumulative

12.5 Results of PBT assessment:

Not applicable, based on available data

12.6 Other adverse effects:

Not dangerous for the ozone layer (Council Regulation (EC) no 1005/2009)

13. Disposal considerations

13.1 Provisions relating to waste:

Waste material code (Directive 2008/98/EC, decision 2001/118/EC)
16 05 06* : laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory chemicals
Depending on branch of industry and production process, also other EURAL codes may be applicable
Hazardous waste according to Directive 2008/98/EC

13.2 Disposal methods:

Dissolve or mix with a combustible solvent
Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber with energy recovery
Remove waste in accordance with local and/or national regulations
Do not discharge into surface water (2000/60/EC, Council decision 2455/2001/EC, O.J. L331 of 15/12/2001)

13.3 Packaging/Container:

Waste material code packaging (Directive 2008/98/EC)
15 01 10* : packaging containing residues of or contaminated by dangerous substances

{13.4 Entsorgung verschmutzter Gebinde:}

14. Transport information

ADR

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADR	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Hazard identification number	90
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

RID

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name RID	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

ADNR

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ADNR	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Classification code	M7
Labels	9
Environmentally hazardous substance mark	yes

IMO

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name IMO	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Labels	9
Marine pollutant	P
Environmentally hazardous substance mark	yes

ICAO

Proper shipping name	Environmentally hazardous substance, solid, n.o.s.
Techn./chem. name ICAO	benzo[k]fluoranthene
UN number	3077
Class	9
Packing group	III
Labels	9
Environmentally hazardous substance mark	yes

15. Regulatory information

15.1 EU Legislation:

DSD/DPD

Enumerated in substance list Annex I of directive 67/548/EEC et sequens





Dangerous for the environment

R-phrases

45	May cause cancer
50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S-phrases

53	Avoid exposure - obtain special instructions before use
45	In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible)
60	This material and its container must be disposed of as hazardous waste
61	Avoid release to the environment. Refer to special instructions/safety data sheets.

Additional recommendations

	Restricted to professional users.

CLP

Classification and labelling according to Regulation (EC) No 1272/2008 – Annex VI and after evaluation of available test data





Signal word

Dgr	Danger

H-statements

H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

P-statements

P202	Do not handle until all safety precautions have been read and understood.
P281	Use personal protective equipment as required.
P273	Avoid release to the environment.
P308 + P313	IF exposed or concerned: Get medical advice/attention.
P391	Collect spillage.
P405	Store locked up.

Supplemental information

	Restricted to professional users.

15.2 National provisions:

15.3 Specific community rules:

Enumerated in Annex XVII of Regulation (EC) No. 1907/2006: Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles.

Legislation	Reference legislation
EG/552/2009	See column 1: 28.
EG/552/2009	See column 1: 50. g)

16. Other information

The information in this safety data sheet is based on data and samples provided to BIG. The sheet was written to the best of our ability and according to the state of knowledge at that time. The safety data sheet only constitutes a guideline for the safe handling, use, consumption, storage, transport and disposal of the substances/preparations/mixtures mentioned under point 1. New safety data sheets are written from time to time. Only the most recent versions may be used. Old versions must be destroyed. Unless indicated otherwise word for word on the safety data sheet, the information does not apply to substances/preparations/mixtures in purer form, mixed with other substances or in processes. The safety data sheet offers no quality specification for the substances/preparations/mixtures in question.

Compliance with the instructions in this safety data sheet does not release the user from the obligation to take all measures dictated by common sense, regulations and recommendations or which are necessary and/or useful based on the real applicable circumstances. BIG does not guarantee the accuracy or exhaustiveness of the information provided. Use of this safety data sheet is subject to the licence and liability limiting conditions as stated in your BIG licence agreement. All intellectual property rights to this sheet are the property of BIG and its distribution and reproduction are limited. Consult your BIG licence agreement for details.

(*) = INTERNAL CLASSIFICATION (NFPA)

PBT-substances = persistent, bioaccumulative and toxic substances

DSD Dangerous Substance Directive
DPD Dangerous Preparation Directive
CLP (EU-GHS) Classification, labelling and packaging (Globally Harmonised System in Europe)

Full text of any R-phrases referred to under headings 2 and 3:

R45	May cause cancer
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Full text of any H-statements referred to under headings 2 and 3:

H350	May cause cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

Full text of any classes referred to under headings 2 and 3:

Aquatic Acute	Hazardous to the aquatic environment - acute
Aquatic Chronic	Hazardous to the aquatic environment - chronic
Carc.	Carcinogenicity

SAFETY DATA SHEET

Revision Date 25-Mar-2024 **Revision Number** 4

1. Identification

Product Name **Benzo[a]pyrene**

Cat No. : **15856**

CAS No 50-32-8
Synonyms Benzo[def]chrysene.; 3,4-Benzopyrene; 3,4-Benzpyrene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757

Emergency Telephone Number
For information **US** call: 001-800-227-6701 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No. **US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Sensitization	Category 1
Germ Cell Mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B

Label Elements

Signal Word
Danger

Hazard Statements
May cause an allergic skin reaction
May cause genetic defects

May cause cancer
May damage fertility. May damage the unborn child



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Avoid breathing dust/fume/gas/mist/vapors/spray
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves
Response
IF exposed or concerned: Get medical attention/advice
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Benzo[a]pyrene	50-32-8	> 96

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Get medical attention if symptoms occur.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms and effects None reasonably foreseeable. . May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Incompatible Materials. Oxidizing agent.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH	Mexico OEL (TWA)
Benzo[a]pyrene		TWA: 0.2 mg/m³		

Legend

OSHA - Occupational Safety and Health Administration

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
Recommended Filter type:	Particulates filter conforming to EN 143.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Dark yellow
Odor	aromatic
Odor Threshold	No information available
pH	Not applicable
Melting Point/Range	175 - 179 °C / 347 - 354.2 °F
Boiling Point/Range	495 °C / 923 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C20H12
Molecular Weight	252.31

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Oxidizing agent
Hazardous Decomposition Products	Carbon monoxide (CO), Carbon dioxide (CO_2)
Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information
Component Information
Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization May cause sensitization by skin contact

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Benzo[a]pyrene	50-32-8	Group 1	Reasonably Anticipated	A2	X	A2

IARC (International Agency for Research on Cancer)

IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

ACGIH: (American Conference of Governmental Industrial Hygienists)
A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Endocrine Disruptor Information

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Benzo[a]pyrene	Group III Chemical	Not applicable	Not applicable

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Persistence and Degradability May persist

Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Benzo[a]pyrene	6.06

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Benzo[a]pyrene - 50-32-8	U022	-

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Technical Name Benzo[a]pyrene
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

IATA

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

IMDG/IMO

UN-No UN3077
Proper Shipping Name Environmentally hazardous substances, solid, n.o.s.
Hazard Class 9
Packing Group III

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Benzo[a]pyrene	50-32-8	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA - Per 40 CFR 751, Regulation of Certain Chemical Substances & Mixtures, Under TSCA Section 6(h) (PBT) Not applicable

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Benzo[a]pyrene	50-32-8	X	-	200-028-5	X	-		-	X	KE-05-0184

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372. Note that PBT chemicals are not eligible for the de minimis exemption. For these chemicals, supplier notification limits are provided.
> 0 % = no low concentration cut-off set, supplier notification limit applies.

Component	CAS No	Weight %	SARA 313 - Threshold Values %	SARA 313 - Reporting threasholds
Benzo[a]pyrene	50-32-8	> 96	> 0 %	RT = 100 lb

SARA 311/312 Hazard Categories
Should this product meet EPCRA 311/312 Tier reporting criteria at 40 CFR 370, refer to Section 2 of this SDS for appropriate classifications.

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzo[a]pyrene	-	-	X	X

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355).

Component	Hazardous Substances RQs	CERCLA Extremely Hazardous Substances RQs	SARA Reportable Quantity (RQ)
Benzo[a]pyrene	1 lb	-	1 lb 0.454 kg

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Benzo[a]pyrene	50-32-8	Carcinogen	0.06 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzo[a]pyrene	X	X	X	X	X

U.S. Department of Transportation
Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	CAS No	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Benzo[a]pyrene	50-32-8	-	Use restricted. See item 72. (see link for restriction details) Use restricted. See item 30. (see link for restriction details) Use restricted. See item 28. (see link for restriction details) Use restricted. See item 50[a]. (see link for restriction details) Use restricted. See item 29. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	SVHC Candidate list - 200-028-5 - Carcinogenic (article 57a); Mutagenic (Article 57b); Toxic for reproduction (Article 57c); PBT (Article 57d); vPvB (Article 57e)

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

REACH links
https://echa.europa.eu/authorisation-list
https://echa.europa.eu/substances-restricted-under-reach
https://echa.europa.eu/candidate-list-table

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Benzo[a]pyrene	50-32-8	Not applicable	Annex III - Substance subject to release reduction	Not applicable	Not applicable

Contains component(s) that meet a 'definition' of per & poly fluoroalkyl substance (PFAS)?
See table for values

PFAS Legend
Listed = Meets the PFAS definition of the named authority

Other International Regulations

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities	Seveso III Directive (2012/18/EC) - Qualifying Quantities	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)

		for Major Accident Notification	for Safety Report Requirements		
Benzo[a]pyrene	50-32-8	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By
Health, Safety and Environmental Department
Email: chem.techinfo@thermofisher.com
www.thermofisher.com

Revision Date 25-Mar-2024
Print Date 25-Mar-2024
Revision Summary New emergency telephone response service provider.

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 8.3
Revision Date 09/07/2024
Print Date 12/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Benzo[ghi]fluoranthene

Product Number : BCR139
Brand : Sigma-Aldrich
CAS-No. : 203-12-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	C18H10
Molecular weight	:	226.27 g/mol
CAS-No.	:	203-12-3

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

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operates as MilliporeSigma in the US and Canada

5.4 Further information

Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.
Storage stability Recommended storage temperature
2 - 8 °C
Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Respiratory protection
Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point: 140 °C (284 °F)

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operates as MilliporeSigma in the US and Canada

f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	slightly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 5.46 at 25 °C (77 °F) - Potential bioaccumulation
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

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10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

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SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : Product contains substance(s) not listed on TSCA inventory.

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

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SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 8.3 Revision Date: 09/07/2024 Print Date: 12/07/2024

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Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 01-May-2012 **Revision Date** 23-Jan-2015 **Revision Number** 2

1. Identification

Product Name **Benzoic acid**

Cat No. : **A63-500; A65-500; A68-30**

Synonyms Benzenecarboxylic acid; Benzenemethanoic acid; Phenylcarboxylic acid; Phenylformic acid; Benzeneformic acid; Carboxybenzene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 1
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Lungs.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye damage
Causes damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Do not eat, drink or smoke when using this product
Response
Get medical attention/advice if you feel unwell
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor/physician
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
May form combustible dust concentrations in air

3. Composition / information on ingredients

Component	CAS-No	Weight %
Benzoic acid	65-85-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Ingestion Do not induce vomiting. Obtain medical attention.

Most important symptoms/effects Causes eye burns. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point 121 °C / 249.8 °F
Method - No information available

Autoignition Temperature Not applicable 570 °C / 1058 °F
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Dust can form an explosive mixture in air.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation.
Environmental Precautions See Section 12 for additional ecological information.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Avoid contact with skin and eyes. Avoid ingestion and inhalation. Do not breathe dust.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Off-white
Odor	aromatic
Odor Threshold	No information available
pH	2.5-3.5 2.9 g/l water
Melting Point/Range	121 - 123 °C / 249.8 - 253.4 °F
Boiling Point/Range	249 °C / 480.2 °F @ 760 mmHg
Flash Point	121 °C / 249.8 °F

Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1.3 hPa @ 96 °C
Vapor Density	Not applicable
Relative Density	No information available
Solubility	soluble
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable 570 °C / 1058 °F
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C7 H6 O2
Molecular Weight	122.12

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Avoid dust formation.

Incompatible Materials Strong acids, Strong bases, Strong oxidizing agents, Strong reducing agents, Metals

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions Aqueous solution, May react with metals and lead to the formation of flammable hydrogen gas.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Benzoic acid	1700 mg/kg (Rat) 2565 mg/kg (Rat)	Not listed	26 mg/m³ (Rat) 1 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes, respiratory system and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Benzoic acid	65-85-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Not mutagenic in AMES Test

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure Lungs

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

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Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Benzoic acid	5 mg/L EC50 = 3 h	180 mg/L LC50 96 h	EC50 = 16.85 mg/L 30 min EC50 = 16.9 mg/L 15 min	300 mg/L EC50 = 24 h 860 mg/L EC50 = 48 h

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Is not likely mobile in the environment due its low water solubility. Will likely be mobile in the environment due to its water solubility.

Component	log Pow
Benzoic acid	1.93

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Benzoic acid	X	X	-	200-618-2	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Benzoic acid	X	5000 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Benzoic acid	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Benzoic acid	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

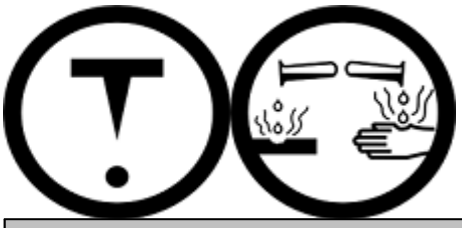
U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class E Corrosive material
D2A Very toxic materials



16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-May-2012
Revision Date 23-Jan-2015
Print Date 23-Jan-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 4.6
Revision Date 12/29/2015
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Beryllium

Product Number : 378135
Brand : Aldrich

CAS-No. : 7440-41-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 2), H330
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitisation (Category 1), H317
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H330 Fatal if inhaled.
H335 May cause respiratory irritation.
H350 May cause cancer.

H372	Causes damage to organs through prolonged or repeated exposure.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Be
Molecular weight	:	9.01 g/mol
CAS-No.	:	7440-41-7
EC-No.	:	231-150-7

Hazardous components

Component	Classification	Concentration
Berylium foil		
	Acute Tox. 3; Acute Tox. 2; Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 1B; STOT SE 3; STOT RE 1; H301, H315, H317, H319, H330, H335, H350, H372	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Beryllium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Berylium foil	7440-41-7	TWA	2.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	25.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
	Remarks	Z27.29-1970		
		CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Beryllium sensitization Chronic beryllium disease (berylliosis) Confirmed human carcinogen Danger of cutaneous absorption Sensitizer		
		C	0.000500 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	2.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5.000000microg ram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25.000000micro gram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		TWA	0.000050 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Beryllium sensitization		

		Chronic beryllium disease (berylliosis) Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Confirmed human carcinogen Danger of cutaneous absorption Sensitizer		
		C	0.000500 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	2microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		CEIL	5microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		Peak	25microgram per cubic meter	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z27.29-1970		
		C	0.0005 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	odourless
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1,278 °C (2,332 °F) - lit.
f)	Initial boiling point and boiling range	2,970 °C (5,378 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.85 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Alkali metals

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

LD50 Intravenous - Rat - 0.496 mg/kg
Remarks: Liver:Hepatitis (hepatocellular necrosis), zonal.

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Hamster
Lungs
Result: negative

Carcinogenicity

Carcinogenicity - Rat - Intratracheal
Tumorigenic:Neoplastic by RTECS criteria. Lungs, Thorax, or Respiration:Tumors. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.

Carcinogenicity - Rabbit - Intravenous
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Musculoskeletal:Tumors.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Berylium foil)
NTP:	Known to be human carcinogen (Berylium foil)
	Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Berylium foil)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: DS1750000

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium, powder
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1567 Class: 6.1 (4.1) Packing group: II EMS-No: F-G, S-G
Proper shipping name: BERYLLIUM POWDER

IATA
UN number: 1567 Class: 6.1 (4.1) Packing group: II
Proper shipping name: Beryllium powder

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Berylium foil	7440-41-7	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Berylium foil	7440-41-7	2008-10-10

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H301	Toxic if swallowed.
H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
Skin Irrit.	Skin irritation
Skin Sens.	Skin sensitisation

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	4
Fire Hazard:	3
Reactivity Hazard:	3

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

SAFETY DATA SHEET

Version 5.2
Revision Date 06/27/2014
Print Date 07/04/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Endosulfan II (beta)

Product Number : 48578
Brand : Supelco

CAS-No. : 33213-65-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P321 Specific treatment (see supplemental first aid instructions on this label).
P330 Rinse mouth.
P391 Collect spillage.
P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : β-Endosulfan

Formula : C9H6Cl6O3S
Molecular Weight : 406.93 g/mol
CAS-No. : 33213-65-9

Hazardous components

Component	Classification	Concentration
β-Endosulfan		
	Acute Tox. 3; Aquatic Acute 1; Aquatic Chronic 1; H301, H410	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N99 (US) or type P2 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	no data available
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	no data available
o)	Partition coefficient: n-octanol/water	no data available
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 240.0 mg/kg

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: RB9875200

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 0.0066 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - > 0.1 - < 1 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
Bioaccumulation other fish - 21 d
- 0.0001 mg/l

Bioconcentration factor (BCF): 9,908

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (β-Endosulfan)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: Marine pollutant
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (β-Endosulfan)
Marine pollutant: No

IATA
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (β-Endosulfan)

15. REGULATORY INFORMATION

SARA 302 Components

SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
β-Endosulfan	33213-65-9	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
β-Endosulfan	33213-65-9	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
β-Endosulfan	33213-65-9	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H301	Toxic if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.2 Revision Date: 06/27/2014 Print Date: 07/04/2016

SAFETY DATA SHEET

Version 5.6
Revision Date 05/23/2016
Print Date 11/17/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : β-HCH

Product Number : 33376
Brand : Sigma-Aldrich
Index-No. : 602-042-00-0

CAS-No. : 319-85-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P322	Specific measures (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_6H_6Cl_6$
Molecular weight	:	290.83 g/mol
CAS-No.	:	319-85-7
EC-No.	:	206-271-3
Index-No.	:	602-042-00-0

Hazardous components

Component	Classification	Concentration
(1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312, H351, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	> 300.0 °C (> 572.0 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-	log Pow: 3.78

	octanol/water	
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 6,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans ((1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: Reasonably anticipated to be a human carcinogen ((1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GV4375000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Poecilia reticulata (guppy) - 1.6 mg/l - 96.0 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 35 d - 0.05 mg/l
	Bioconcentration factor (BCF): 500

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. ((1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. ((1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. ((1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. (1α,2β,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	CAS-No. 319-85-7	Revision Date 2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 05/23/2016 Print Date: 11/17/2016

SAFETY DATA SHEET

Version 5.11
Revision Date 06/18/2015
Print Date 02/11/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Bis(2-ethylhexyl) phthalate

Product Number : 80030
Brand : Sigma-Aldrich
Index-No. : 607-317-00-9

CAS-No. : 117-81-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Reproductive toxicity (Category 1B), H360

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H360 May damage fertility or the unborn child.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Endocrine disrupting chemical(s)

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	'Dioctyl' phthalate Phthalic acid bis(2-ethylhexyl ester) DEHP
Formula	:	$C_{24}H_{38}O_4$
Molecular weight	:	390.56 g/mol
CAS-No.	:	117-81-7
EC-No.	:	204-211-0
Index-No.	:	607-317-00-9
Registration number	:	01-2119484611-38-XXXX

Hazardous components

Component	Classification	Concentration
bis(2-Ethylhexyl) phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Repr. 1B; H360	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
bis(2-Ethylhexyl) phthalate	117-81-7	TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Lower Respiratory Tract irritation Confirmed animal carcinogen with unknown relevance to humans		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 480 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 230 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-50.0 °C (-58.0 °F)
f)	Initial boiling point and boiling range	386 °C (727 °F) - lit.
g)	Flash point	207.0 °C (404.6 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0.3 %(V)
k)	Vapour pressure	1.6 hPa (1.2 mmHg) at 93.0 °C (199.4 °F)
l)	Vapour density	No data available
m)	Relative density	0.985 g/cm3 at 20 °C (68 °F)
n)	Water solubility	insoluble

o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	390.0 °C (734.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 30,000 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 25,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (bis(2-Ethylhexyl) phthalate)

NTP: Reasonably anticipated to be a human carcinogen (bis(2-Ethylhexyl) phthalate)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
May cause congenital malformation in the fetus.
Presumed human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: TI0350000

Effects due to ingestion may include:, Gastrointestinal disturbance

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - > 0.67 mg/l - 96 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - > 0.32 mg/l - 96 h
	LC50 - Cyprinodon variegatus (sheepshead minnow) - > 0.17 mg/l - 96 h
	LC50 - Lepomis macrochirus (Bluegill) - > 0.20 mg/l - 96 h
	NOEC - other fish - > 0.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 0.16 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	Result: - Readily biodegradable (OECD Test Guideline 301)

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 100 d - 0.014 mg/l Bioconcentration factor (BCF): 113 Remarks: Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (bis(2-Ethylhexyl) phthalate)
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
bis(2-Ethylhexyl) phthalate	117-81-7	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. bis(2-Ethylhexyl) phthalate	CAS-No. 117-81-7	Revision Date 2009-02-01
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. bis(2-Ethylhexyl) phthalate	CAS-No. 117-81-7	Revision Date 2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

H360	May damage fertility or the unborn child.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.11 Revision Date: 06/18/2015 Print Date: 02/11/2016

SAFETY DATA SHEET

Revision Date 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **Cadmium**

Cat No. : **C3-500**

CAS No 7440-43-9
Synonyms No information available

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable solids	Category 2
Acute oral toxicity	Category 4
Acute dermal toxicity	Category 4
Acute Inhalation Toxicity - Dusts and Mists	Category 2
Germ Cell Mutagenicity	Category 2
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system.	
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Kidney, Blood.	
Combustible dust	Yes

Label Elements

Signal Word

Danger

Hazard Statements
Flammable solid
May form combustible dust concentrations in air
Fatal if inhaled
Harmful if swallowed
Harmful in contact with skin
May cause respiratory irritation
Suspected of causing genetic defects
May cause cancer
Suspected of damaging fertility. Suspected of damaging the unborn child
Causes damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting equipment
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Immediately call a POISON CENTER or doctor/physician
Skin
IF ON SKIN: Wash with plenty of soap and water
Wash contaminated clothing before reuse
Call a POISON CENTER or doctor/physician if you feel unwell
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
Fight fire with normal precautions from a reasonable distance
Evacuate area
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
WARNING. Cancer and Reproductive Harm - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS No	Weight %
Cadmium	7440-43-9	100

4. First-aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. In the case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Immediate medical attention is required.

Ingestion Do NOT induce vomiting. Call a physician or poison control center immediately.

Most important symptoms and effects None reasonably foreseeable. . Kidney disorders: May cause harm to the unborn child: Blood disorders

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available

Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Fine dust dispersed in air may ignite. Dust can form an explosive mixture with air. Pyrophoric properties of solids and liquids. Do not allow run-off from fire-fighting to enter drains or water courses.

Hazardous Combustion Products
Toxic fumes.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
4	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust

formation. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Use only under a chemical fume hood. Do not breathe (dust, vapor, mist, gas). Do not ingest. If swallowed then seek immediate medical assistance.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Store under an inert atmosphere. Incompatible Materials. Strong oxidizing agents. Strong acids. Sulfur oxides.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Cadmium	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³	Ceiling: 0.3 mg/m³ Ceiling: 0.6 mg/m³ (Vacated) STEL: 0.3 ppm TWA: 0.1 mg/m³ TWA: 0.2 mg/m³ TWA: 5 µg/m³	IDLH: 9 mg/m³	TWA: 0.01 mg/m³ TWA: 0.002 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures When using do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes or clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

9. Physical and chemical properties

Physical State Solid

Appearance	Silver
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	321 °C / 609.8 °F
Boiling Point/Range	765 °C / 1409 °F @ 760 mmHg
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	8.64 @ 25°C
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	Cd
Molecular Weight	112.40

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under recommended storage conditions. Moisture sensitive. Air sensitive.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation. Exposure to air or moisture over prolonged periods.

Incompatible Materials Strong oxidizing agents, Strong acids, Sulfur oxides

Hazardous Decomposition Products Toxic fumes

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Cadmium	LD50 = 2330 mg/kg (Rat)	Not listed	LC50 = 25 mg/m³ (Rat) 30 min

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
Cadmium	7440-43-9	Group 1	Known	A2	X	A2

IARC (International Agency for Research on Cancer)	*IARC (International Agency for Research on Cancer)* *Group 1 - Carcinogenic to Humans* *Group 2A - Probably Carcinogenic to Humans* *Group 2B - Possibly Carcinogenic to Humans*
NTP: (National Toxicity Program)	*NTP: (National Toxicity Program)* *Known - Known Carcinogen* *Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen*
ACGIH: (American Conference of Governmental Industrial Hygienists)	*A1 - Known Human Carcinogen* *A2 - Suspected Human Carcinogen* *A3 - Animal Carcinogen* *ACGIH: (American Conference of Governmental Industrial Hygienists)*

Mutagenic Effects Possible risk of irreversible effects

Reproductive Effects Possible risk of impaired fertility. May cause harm to the unborn child.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Respiratory system
STOT - repeated exposure Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Kidney disorders: May cause harm to the unborn child: Blood disorders

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information



Ecotoxicity

The product contains following substances which are hazardous for the environment. Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Cadmium	Not listed	LC50: 0.0004 - 0.003 mg/L, 96h (Pimephales promelas) LC50: = 0.016 mg/L, 96h (Oryzias latipes) LC50: = 21.1 mg/L, 96h flow-through (Lepomis macrochirus) LC50: = 0.24 mg/L, 96h static (Cyprinus carpio) LC50: = 4.26 mg/L, 96h semi-static (Cyprinus carpio) LC50: = 0.002 mg/L, 96h	Not listed	EC50: = 0.0244 mg/L, 48h Static (Daphnia magna)

		(Cyprinus carpio) LC50: = 0.006 mg/L, 96h static (Oncorhynchus mykiss) LC50: = 0.003 mg/L, 96h flow-through (Oncorhynchus mykiss)		

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Technical Name	Cadmium
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

TDG

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

IATA

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

IMDG/IMO

UN-No	UN2930
Proper Shipping Name	Toxic solid, flammable, organic, n.o.s.
Hazard Class	6.1
Subsidiary Hazard Class	4.1
Packing Group	I

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
Cadmium	7440-43-9	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories

Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
Cadmium	7440-43-9	X	-	231-152-8	X	X		X	X	KE-04397

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313

Component	CAS No	Weight %	SARA 313 - Threshold Values %
Cadmium	7440-43-9	100	0.1

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Cadmium	-	-	X	X

Clean Air Act

OSHA - Occupational Safety and Health Administration Not applicable

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Cadmium	5 µg/m³ TWA 2.5 µg/m³ Action Level	-

CERCLA This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Cadmium	10 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals.

Component	CAS No	California Prop. 65	Prop 65 NSRL	Category
Cadmium	7440-43-9	Carcinogen Developmental Male Reproductive	0.05 µg/day	Developmental Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Cadmium	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): Y
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Component	REACH (1907/2006) - Annex XIV - Substances Subject to Authorization	REACH (1907/2006) - Annex XVII - Restrictions on Certain Dangerous Substances	REACH Regulation (EC 1907/2006) article 59 - Candidate List of Substances of Very High Concern (SVHC)
Cadmium	-	Use restricted. See item 72. (see link for restriction details) Use restricted. See item 23. (see link for restriction details) Use restricted. See item 28. (see link for restriction details) Use restricted. See item 75. (see link for restriction details)	SVHC Candidate list - 231-152-8 - Carcinogenic, Article 57a;Specific target organ toxicity after repeated exposure, Article 57(f) - human health

After the sunset date the use of this substance requires either an authorization or can only be used for exempted uses, e.g. use in scientific research and development which includes routine analytics or use as intermediate.

https://echa.europa.eu/authorisation-list
https://echa.europa.eu/substances-restricted-under-reach
https://echa.europa.eu/candidate-list-table

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
Cadmium	7440-43-9	Listed	Not applicable	Not applicable	0.01% (Max. Conc.)

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
Cadmium	7440-43-9	Not applicable	Not applicable	Not applicable	Annex I - Y26

16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SECTION 1: Identification of the substance/mixture and of the company/ undertaking

1.1 Product identifier

Calcium metal, granular (102780)

Calcium metal, granular ; CAS No. : 7440-70-2 ; EC No. : 231-179-5 ; Index No. : 020-001-00-X ; REACH No. : 01-2119516038-45-XXXX

1.2 Relevant identified uses of the substance or mixture and uses advised against

Relevant identified uses

For manufacturing, processing, laboratory or repacking use only.

Uses advised against

Uses other than those recommended.

1.3 Details of the supplier of the safety data sheet

Supplier (manufacturer/importer/only representative/downstream user/distributor)

DC Fine Chemicals Ltd

Street : 88 Hill Top

Postal code/City : NW11 6DY London United Kingdom

Telephone : +44 (0)20 7586 6800

Telefax : +44 (0)20 7504 1701

Information contact : info@dcfinechemicals.com

1.4 Emergency telephone number

(Only available during office hours; Monday-Friday; 08:00-18:00)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 [CLP]

Water-react. 2 ; H261 - Substances or mixtures which, in contact with water, emit flammable gases : Category 2 ; In contact with water releases flammable gases.

2.2 Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms



Flame (GHS02)

Signal word

DANGER

Hazard statements

H261 In contact with water releases flammable gases.

Precautionary statements

P223	Do not allow contact with water.
P231+P232	Handle and store contents under inert gas. Protect from moisture.
P280	Wear protective gloves/protective clothing/eye protection/face protection.
P302+P335+P334	IF ON SKIN: Brush off loose particles from skin. Immerse in cool water [or wrap in wet bandages].
P370+P378	In case of fire: Use ... to extinguish.
P402+P404	Store in a dry place. Store in a closed container.

2.3 Other hazards

None

SECTION 3: Composition/information on ingredients

3.1 Substances

Substance name : Calcium metal, granular

Index No. : 020-001-00-X

EC No. : 231-179-5

REACH No. : 01-2119516038-45-XXXX

CAS No. : 7440-70-2

Purity : 100 % [mass]

SECTION 4: First aid measures

4.1 Description of first aid measures

Remove contaminated, saturated clothing immediately. After contact with skin, wash immediately with plenty of water and soap. After contact with the eyes, rinse with water with the eyelids open for a sufficient length of time, then consult an ophthalmologist immediately. Remove victim out of the danger area. When in doubt or if symptoms are observed, get medical advice.

4.2 Most important symptoms and effects, both acute and delayed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person or a person with cramps.

4.3 Indication of any immediate medical attention and special treatment needed

In case of doubt or when symptoms of feeling unwell persist, get medical attention. Never administer anything orally to persons who are unconscious.

SECTION 5: Firefighting measures

The product is Highly inflammable, it can cause or considerably worsen a fire, the necessary prevention measures should be taken and risks avoided. In case of fire, the following measures are recommended:

5.1 Extinguishing media

Suitable extinguishing media

Extinguisher powder or CO2. In case of more serious fires, also alcohol-resistant foam and water spray.

Unsuitable extinguishing media

Do not use a direct stream of water to extinguish. In the presence of electrical voltage, you cannot use water or foam as extinguishing media.

5.2 Special hazards arising from the substance or mixture

In case of fire may be liberated: Pyrolysis products, toxic

5.3 Advice for firefighters

Wear a self-contained breathing apparatus and chemical protective clothing. Do not inhale explosion and combustion gases. In case of fire: Wear self-contained breathing apparatus.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel

Wear a self-contained breathing apparatus and chemical protective clothing.

For emergency responders

Eliminate possible ignition points and ventilate the area. No smoking. Avoid breathing fumes.For exposure control and individual protection measures, see section 8.

6.2 Environmental precautions

Do not allow to enter into surface water or drains. In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities. Retain contaminated washing water and dispose it.

6.3 Methods and material for containment and cleaning up

For containment

Collect in closed and suitable containers for disposal.

For cleaning up

The contaminated area should be cleaned up immediately with: Water Soak up inert absorbent and dispose as waste requiring special attention. Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents). Avoid dust formation. Clear spills immediately.

6.4 Reference to other sections

Reference to other sections Disposal: see section 13 Personal protection equipment: see section 8

SECTION 7: Handling and storage

7.1 Precautions for safe handling

In case of insufficient ventilation and/or through use, explosive/highly flammable mixtures may develop.

Protective measures



When using do not eat, drink, smoke, sniff. Wear personal protection equipment (refer to section 8).

Measures to prevent aerosol and dust generation

Vapours can form explosive mixtures with air. Take precautionary measures against static discharges. Use only in well-ventilated areas. Do not breathe gas/fumes/vapour/spray. Do not breathe dust.

Environmental precautions

Use appropriate container to avoid environmental contamination.

Specific requirements or handling rules

Handle and open container with care.

Advices on general occupational hygiene

Take care for general good hygiene and housekeeping.

7.2 Conditions for safe storage, including any incompatibilities

Technical measures and storage conditions

Storage temperature :
Keep in a cool, well-ventilated place. Keep away from sources of ignition - No smoking.

Requirements for storage rooms and vessels

Only use containers specifically approved for the substance/product.

Hints on joint storage

Store at least 3 metres apart from: Chemicals/products that react together readily Protect against Humidity. UV-radiation/sunlight

Storage class (TRGS 510) : 4.3

7.3 Specific end use(s)

None

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

None

8.2 Exposure controls

Only wear fitting, comfortable and clean protective clothing.

Personal protection equipment

Eye/face protection



Eye glasses with side protection Face protection shield EN 166

Skin protection

Hand protection



Tested protective gloves must be worn EN ISO 374

Body protection

For the protection against direct skin contact, body protective clothing is essential (in addition to the usual working clothes). Wear anti-static footwear and clothing Wash contaminated clothing prior to re-use.



Respiratory protection

If technical exhaust or ventilation measures are not possible or insufficient, respiratory protection must be worn.



Particle filter device (EN 143).

Thermal hazards

No special measures are necessary.

Environmental exposure controls

No information available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance : solid

Safety characteristics

Melting point/freezing point :	(1013 hPa)	850	°C	
Initial boiling point and boiling range :	(1013 hPa)	1175	°C	
Decomposition temperature :	(1013 hPa)	No data available		
Flash point :		No data available		
Auto-ignition temperature :		No data available		
Lower explosion limit :		No data available		
Upper explosion limit :		No data available		
Vapour pressure :	(50 °C)	No data available		
Density :	(20 °C)	No data available		
Solvent separation test :	(20 °C)	not applicable		
Water solubility :	(20 °C)	4	g/l	
Fat solubility :	(20 °C)	No data available.		
pH :		14		
log P O/W :		No data available		
Flow time :	(20 °C)	No data available		DIN-cup 4 mm
Viscosity :	(20 °C)	No data available		
Relative vapour density :	(20 °C)	No data available		
Evaporation rate :		No data available		
Flammable solids :	No data available.			
Flammable gases :	No data available.			
Explosive properties :	No data available.			

9.2 Other information

None

SECTION 10: Stability and reactivity

10.1 Reactivity

The product does not present hazards by their reactivity.

10.2 Chemical stability

The product is chemically stable under recommended conditions of storage, use and temperature. Safe handling: see

section 7

10.3 Possibility of hazardous reactions
The product does not present possibility of hazardous reactions.

10.4 Conditions to avoid
Avoid any improper handling.

10.5 Incompatible materials
Keep away from oxidising agents and from highly alkaline or acidic materials in order to prevent exothermic reactions.

10.6 Hazardous decomposition products
In case of fire may be liberated: Hazardous combustion products

SECTION 11: Toxicological information

11.1 Information on hazard classes as defined in Regulation (EC) No 1272/2008
Acute toxicity
No information available.
Corrosion
Skin corrosion/irritation
No information available.
Serious eye damage/eye irritation
No information available.
Respiratory or skin sensitisation
No information available.
CMR effects (carcinogenicity, mutagenicity and toxicity for reproduction)
Carcinogenicity
No information available.
Germ cell mutagenicity
No information available.
Reproductive toxicity
No information available.
STOT-single exposure
No information available.
STOT-repeated exposure
No information available.
Aspiration hazard
No information available.

11.2 Information on other hazards
No information available.

SECTION 12: Ecological information

12.1 Toxicity
Aquatic toxicity
Acute (short-term) toxicity to crustacea

Parameter :	EC50 (Calcium metal, granular ; CAS No. : 7440-70-2)
Species :	Daphnia magna (Big water flea)
Evaluation parameter :	Acute (short-term) toxicity to crustacea
Effective dose :	330 mg/l
Exposure time :	48 hour(s)

12.2 Persistence and degradability
No information available.

12.3 Bioaccumulative potential
No information available.

12.4 Mobility in soil
No information available.

12.5 Results of PBT and vPvB assessment
This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.

12.6 Endocrine disrupting properties
No information available.

12.7 Other adverse effects
No information available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process. Do not dump into sewers or waterways. Waste and empty containers must be handled and eliminated according to current, local/national legislation. Follow the provisions of Directive 2008/98/EC regarding waste management.

Product/Packaging disposal
Waste treatment options
Recycle according to official regulations. Evidence for disposal must be provided.

Appropriate disposal / Product
Dispose of waste according to applicable legislation.

Appropriate disposal / Package
Non-contaminated packages must be recycled or disposed of. Contaminated packages must be completely emptied and can be re-used following proper cleaning. Packing which cannot be properly cleaned must be disposed of. Handle contaminated packages in the same way as the substance itself.

SECTION 14: Transport information

14.1 UN number
UN 1401

14.2 UN proper shipping name
Land transport (ADR/RID)
CALCIUM

Sea transport (IMDG)
CALCIUM

Air transport (ICAO-TI / IATA-DGR)

CALCIUM

14.3 Transport hazard class(es)

Land transport (ADR/RID)

Class(es) :	4.3
Classification code :	W2
Hazard identification number (Kemler No.) :	423
Tunnel restriction code :	D/E
Special provisions :	LQ 500 g · E 2
Hazard label(s) :	4.3

Sea transport (IMDG)

Class(es) :	4.3
EmS-No. :	F-G / S-O
Special provisions :	LQ 500 g · E 2 · IMDG-Code segregation group 26 · IMDG-Code segregation group 35
Hazard label(s) :	4.3

Air transport (ICAO-TI / IATA-DGR)

Class(es) :	4.3
Special provisions :	E 2
Hazard label(s) :	4.3

14.4 Packing group

II

14.5 Environmental hazards

Land transport (ADR/RID) : No
Sea transport (IMDG) : No
Air transport (ICAO-TI / IATA-DGR) : No

14.6 Special precautions for user

Hazard label(s) :



14.7 Transport in bulk according to Annex II of Marpol and the IBC Code

No information available.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH) Classification according to Regulation (EC) No 1272/2008 [CLP] according to Regulation (EU) No. 2020/878

EU legislation

Authorisations and/or restrictions on use

Restrictions on use

Regulation (EC) No. 1907/2006 (REACH), Annex XVII (restrictions)

Use restriction according to REACH annex XVII, no. : 3

National regulations
Water hazard class
Class : nwg (Non-hazardous to water)

15.2 Chemical Safety Assessment
No information available.

SECTION 16: Other information

16.1 Indication of changes
None

16.2 Abbreviations and acronyms

ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road
ASTM:	ASTM International, originally known as American Society for Testing and Materials (ASTM)
EINECS:	European Inventory of Existing Commercial Chemical Substances
EC50:	Effective Concentration 50 (Maximum Effective Concentration for 0% of Individuals)
LC50:	Lethal Concentration 50 (Lethal Concentration for 50% of Individuals)
IC50:	Inhibitor Concentration 50 (Inhibitory Concentration for 50% of Individuals)
NOEL:	No Observed Effect Level (Maximum dose without effect)
DNEL:	Derived No Effect Level (Derived no-effect dose)
DMEL:	Derived Minimum Effect Level (Derived dose of minimal effect)
CLP:	Classification, Labelling and Packaging
CSR:	Chemical Safety Report
LD50:	Lethal Dose 50 (Lethal Dose for 50% of Individuals)
IATA:	International Air Transport Association
ICAO:	International Civil Aviation Organization
Codice IMDG:	International Maritime Dangerous Goods code
PBT:	Persistent, bioaccumulative and toxic
RID:	Regulations concerning the international rail transport of Dangerous Goods
STEL:	Short term exposure limit
TLV:	Threshold limit value
TWA:	Time Weighted Average
UE:	European Union
vPvB:	Very persistent very bioaccumulative
N.D.:	Uvailable
N.A.:	Not applicable
VwVwS.:	Text of Administrative Regulation on the Classification of Substances hazardous to waters into Water Hazard Classes

16.3 Key literature references and sources for data
None

16.4 Relevant H- and EUH-phrases (Number and full text)
H261 In contact with water releases flammable gases.

16.5 Training advice
None

16.6 Additional information
None

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

SAFETY DATA SHEET

Version 5.6
Revision Date 12/10/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Carbon disulfide

Product Number : 180173
Brand : Sigma-Aldrich
Index-No. : 006-003-00-3

CAS-No. : 75-15-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), H372
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H225	Highly flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.

H401	Toxic to aquatic life.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	CS_2
Molecular weight	:	76.14 g/mol
CAS-No.	:	75-15-0
EC-No.	:	200-843-6
Index-No.	:	006-003-00-3

Hazardous components

Component	Classification	Concentration
Carbon disulphide		
	Flam. Liq. 2; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; Repr. 2; STOT RE 1; Aquatic Acute 2; H225, H315, H319, H332, H361, H372, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides
Flash back possible over considerable distance., Container explosion may occur under fire conditions., Vapours may form explosive mixture with air., May explode when heated.

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Refrigerate before opening.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Carbon disulphide	75-15-0	TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	1.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	20.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		CEIL	30.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		Peak	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		TWA	1.000000 ppm 3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		ST	10.000000 ppm 30.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		See Table Z-2		
		TWA	20 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		
		CEIL	30 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		

		Peak	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.3-1968		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Carbon disulphide	75-15-0	2-Thiothiazolidine-4-carboxylix acid (TTCA)	0.5000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	Stench.
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -112 °C (-170 °F) - lit.
f)	Initial boiling point and boiling range	46 °C (115 °F) - lit.
g)	Flash point	-30 °C (-22 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 50 %(V) Lower explosion limit: 1.3 %(V)
k)	Vapour pressure	394.956 hPa (296.241 mmHg) at 20 °C (68 °F) 1,342.711 hPa (1,007.116 mmHg) at 55 °C (131 °F)
l)	Vapour density	2.63 - (Air = 1.0)
m)	Relative density	1.266 g/mL at 25 °C (77 °F)
n)	Water solubility	2.9 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	log Pow: 2.7 at 25 °C (77 °F)
p)	Auto-ignition temperature	97 - 107 °C (207 - 225 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	71.9 mN/m at 19.5 °C (67.1 °F)
Relative vapour density	2.63 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Alkali metals, Zinc, Amines, Azides, Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - female - > 2,000 mg/kg
(OECD Test Guideline 423)

LC50 Inhalation - Rat - male and female - 4 h - 10.35 mg/l
(OECD Test Guideline 403)

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
- Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Ames test
Salmonella typhimurium
Result: negative

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Suspected human reproductive toxicant

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: FF6650000

May cause convulsions.

Liver - Irregularities - Based on Human Evidence
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Poecilia reticulata (guppy) - 4 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 2.1 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - Chlorella pyrenoidosa - 21 mg/l - 96 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability: aerobic - Exposure time 28 d
Result: > 80 % - Readily biodegradable
(OECD Test Guideline 301D)

12.3 Bioaccumulative potential

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1131 Class: 3 (6.1) Packing group: I
Proper shipping name: Carbon disulfide
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1131 Class: 3 (6.1) Packing group: I EMS-No: F-E, S-D
Proper shipping name: CARBON DISULPHIDE

IATA
UN number: 1131 Class: 3 (6.1)
Proper shipping name: Carbon disulphide
IATA Passenger: Not permitted for transport
IATA Cargo: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2007-07-01

California Prop. 65 Components

WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

	CAS-No.	Revision Date
Carbon disulphide	75-15-0	2008-06-17

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure if inhaled.
H401	Toxic to aquatic life.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 12/10/2015 Print Date: 02/09/2016

SAFETY DATA SHEET

Version 5.10
Revision Date 01/06/2016
Print Date 03/03/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Carbon tetrachloride

Product Number : 319961
Brand : Sigma-Aldrich
Index-No. : 602-008-00-5

CAS-No. : 56-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Skin sensitisation (Sub-category 1B), H317
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Liver, Kidney, H372
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412
Hazardous to the ozone layer (Category 1), H420

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H317	May cause an allergic skin reaction.
H351	Suspected of causing cancer.
H372	Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure if inhaled.

H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing should not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.
P502	Refer to manufacturer/ supplier for information on recovery/ recycling.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Rapidly absorbed through skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Tetrachloromethane
Formula	:	CCl_4CCl_4
Molecular weight	:	153.82 g/mol
CAS-No.	:	56-23-5
EC-No.	:	200-262-8
Index-No.	:	602-008-00-5

Hazardous components

Component	Classification	Concentration
Tetrachloromethane		
	Acute Tox. 3; Skin Sens. 1B; Carc. 2; STOT RE 1; Aquatic Acute 3; Aquatic Chronic 3; Ozone 1; H301 + H311 + H331, H317, H351, H372, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Tetrachloromethane	56-23-5	TWA	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		STEL	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		ST	2.000000 ppm 12.600000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		TWA	10.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		CEIL	25.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		Peak	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		See Table Z-2		
		TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		STEL	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Suspected human carcinogen Danger of cutaneous absorption		
		ST	2 ppm 12.6 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A		
		See Table Z-2		
		TWA	10 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		CEIL	25 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		Peak	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.17-1967		
		TWA	2 ppm 12.6 mg/m3	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 240 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	sweet
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -23 °C (-9 °F) - lit.
f)	Initial boiling point and boiling range	76 - 77 °C (169 - 171 °F) - lit.
g)	Flash point	does not flash
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	No data available

	flammability or explosive limits	
k)	Vapour pressure	45 hPa (34 mmHg) at 0.3 °C (32.5 °F) 120 hPa (90 mmHg) at 19.8 °C (67.6 °F) 14,549 hPa (10,913 mmHg) at 24 °C (75 °F)
l)	Vapour density	No data available
m)	Relative density	1.594 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.8461 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 2.83 at 25 °C (77 °F)
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	26.7 mN/m at 20 °C (68 °F) 19.5 mN/m at 80 °C (176 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2,350 mg/kg

LC50 Inhalation - Rat - 4 h - 8000 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h
(Draize Test)

Respiratory or skin sensitisation
- Mouse
Result: The product is a skin sensitiser, sub-category 1B.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification. Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Tetrachloromethane)
NTP:	Reasonably anticipated to be a human carcinogen (Tetrachloromethane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Inhalation - Causes damage to organs through prolonged or repeated exposure. - Liver, Kidney

Aspiration hazard
No data available

Additional Information
RTECS: FG4900000

Vomiting, Diarrhoea, Abdominal pain, Nausea, Dizziness, Headache, Damage to the eyes., Liver injury may occur., Kidney injury may occur., Exposure to and/or consumption of alcohol may increase toxic effects., Contact with skin can cause:, Pain, Erythema, hyperemia

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Danio rerio (zebra fish) - 24.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 35 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	Growth inhibition EC50 - Algae - 20 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 21 d - 52.3 µg/l
	Bioconcentration factor (BCF): 30

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1846 Class: 6.1 Packing group: II
Proper shipping name: Carbon tetrachloride
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1846 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: CARBON TETRACHLORIDE
Marine pollutant: yes

IATA
UN number: 1846 Class: 6.1 Packing group: II
Proper shipping name: Carbon tetrachloride

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Tetrachloromethane	56-23-5	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	56-23-5	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H317	May cause an allergic skin reaction.
H331	Toxic if inhaled.
H351	Suspected of causing cancer.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.10 Revision Date: 01/06/2016 Print Date: 03/03/2016

SAFETY DATA SHEET
SIN-1 (chloride)

Revision: 12/19/2018
Supersedes Revision: 01/23/2015

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 2015/830 and US OSHA HCS 2015

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

1.1 Product Code: 82220

Product Name: SIN-1 (chloride)

Synonyms: 5-amino-3-(4-morpholinyl)-1,2,3-oxadiazolium chloride; Linsidomine; 3-Morpholino-sydnonimine;

1.2 Relevant identified uses of the substance or mixture and uses advised against:

Relevant identified uses: For research use only, not for human or veterinary use.

1.3 Details of the Supplier of the Safety Data Sheet:

Company Name: Cayman Chemical Company
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108

Web site address: www.caymanchem.com

Information: Cayman Chemical Company +1 (734)971-3335

1.4 Emergency telephone number:

Emergency Contact: CHEMTREC Within USA and Canada: +1 (800)424-9300
CHEMTREC Outside USA and Canada: +1 (703)527-3887

Section 2. Hazards Identification

2.1 Classification of the Substance or Mixture:

2.2 Label Elements:

GHS Signal Word: **None**

GHS Hazard Phrases:

Based on evaluation of currently available data this substance or mixture is not classifiable according to GHS.

GHS Precaution Phrases:

No phrases apply.

GHS Response Phrases:

No phrases apply.

GHS Storage and Disposal Phrases:

Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.3 Adverse Human Health Effects and Symptoms: Material may be irritating to the mucous membranes and upper respiratory tract.
May be harmful by inhalation, ingestion, or skin absorption.
May cause eye, skin, or respiratory system irritation.
To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

CAS # / RTECS #	Hazardous Components (Chemical Name)/ REACH Registration No.	Concentration	EC No./ EC Index No.	GHS Classification
16142-27-1 WU7687800	SIN-1 Chloride	100.0 %	605-254-1 NA	Flam. Sol. 1: H228 Self-React. B: H241 Acute Tox.(O) 4: H302 Skin Sens. 1A: H317 Aquatic (C) 2: H411

SAFETY DATA SHEET
SIN-1 (chloride)

Revision: 12/19/2018
Supersedes Revision: 01/23/2015

Section 4. First Aid Measures

4.1 Description of First Aid Measures:

In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.

In Case of Ingestion: Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

Section 5. Fire Fighting Measures

5.1 Suitable Extinguishing Media: Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.
Use water spray to cool fire-exposed containers.

Unsuitable Extinguishing Media: A solid water stream may be inefficient.

5.2 Flammable Properties and Hazards: No data available.

No data available.

Flash Pt: No data.

Explosive Limits: LEL: No data. UEL: No data.

Autoignition Pt: No data.

5.3 Fire Fighting Instructions: As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

6.1 Protective Precautions, Protective Equipment and Emergency Procedures: Avoid raising and breathing dust, and provide adequate ventilation.
As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).

6.2 Environmental Precautions: Take steps to avoid release into the environment, if safe to do so.

6.3 Methods and Material For Containment and Cleaning Up: Contain spill and collect, as appropriate.
Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

7.1 Precautions To Be Taken in Handling: Avoid breathing dust/fume/gas/mist/vapours/spray.
Avoid prolonged or repeated exposure.

7.2 Precautions To Be Taken in Storing: Keep container tightly closed.
Store in accordance with information listed on the product insert.

Section 8. Exposure Controls/Personal Protection

8.1 Exposure Parameters:

8.2 Exposure Controls:

8.2.1 Engineering Controls (Ventilation etc.): Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

8.2.2 Personal protection equipment:

Eye Protection: Safety glasses

Protective Gloves: Compatible chemical-resistant gloves

Other Protective Clothing: Lab coat

Respiratory Equipment (Specify Type): NIOSH approved respirator, as conditions warrant.

Work/Hygienic/Maintenance Practices: Do not take internally.
Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower.
Wash thoroughly after handling.

No data available.

Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States:	[ ] Gas [ ] Liquid [X] Solid
Appearance and Odor:	A crystalline solid
pH:	No data.
Melting Point:	No data.
Boiling Point:	No data.
Flash Pt:	No data.
Evaporation Rate:	No data.
Flammability (solid, gas):	No data available.
Explosive Limits:	LEL: No data. UEL: No data.
Vapor Pressure (vs. Air or mm Hg):	No data.
Vapor Density (vs. Air = 1):	No data.
Specific Gravity (Water = 1):	No data.
Solubility in Water:	No data.
Solubility Notes:	~10 mg/ml in PBS (pH 7.2); ~5 mg/ml in EtOH, DMSO, & DMF;
Octanol/Water Partition Coefficient:	No data.
Autoignition Pt:	No data.
Decomposition Temperature:	No data.
Viscosity:	No data.

9.2 Other Information

Percent Volatile:	No data.
Molecular Formula & Weight:	$C_6H_{11}N_4O_2 \cdot Cl$ 206.6

Section 10. Stability and Reactivity

10.1 **Reactivity:** No data available.

10.2 **Stability:** Unstable [ ] Stable [X]

10.3 **Stability Note(s):** Stable if stored in accordance with information listed on the product insert.

Polymerization: Will occur [ ] Will not occur [X]

10.4 **Conditions To Avoid:** No data available.

10.5 **Incompatibility - Materials To Avoid:** strong oxidizing agents

10.6 **Hazardous Decomposition or Byproducts:** carbon dioxide
carbon monoxide
hydrogen chloride gas
nitrogen oxides

Section 11. Toxicological Information

11.1 **Information on Toxicological Effects:** The toxicological effects of this product have not been thoroughly studied.
SIN-1 (chloride) - Toxicity Data: Oral LD50 (mouse): 480 mg/kg; Intraperitoneal LD50 (mouse): 315 mg/kg;

Chronic Toxicological Effects: SIN-1 (chloride) - Investigated as a drug and mutagen.
Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here.
See actual entry in RTECS for complete information.
SIN-1 (chloride) RTECS Number: WU7687800

CAS #	Hazardous Components (Chemical Name)	NTP	IARC	ACGIH	OSHA
16142-27-1	SIN-1 Chloride	n.a.	n.a.	n.a.	n.a.

Section 12. Ecological Information

12.1 **Toxicity:** Avoid release into the environment.
Runoff from fire control or dilution water may cause pollution.

12.2 **Persistence and Degradability:** No data available.

12.3 **Bioaccumulative Potential:** No data available.

12.4 **Mobility in Soil:** No data available.

12.5 **Results of PBT and vPvB assessment:** No data available.

12.6 **Other adverse effects:** No data available.

Section 13. Disposal Considerations

13.1 **Waste Disposal Method:** Dispose in accordance with local, state, and federal regulations.

SAFETY DATA SHEET
SIN-1 (chloride)

Revision: 12/19/2018
Supersedes Revision: 01/23/2015

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Not dangerous goods.

DOT Hazard Class:

UN/NA Number:

14.1 LAND TRANSPORT (European ADR/RID):

ADR/RID Shipping Name: Not dangerous goods.

UN Number:

Hazard Class:

14.3 AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Not dangerous goods.

Additional Transport Information: Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

CAS #	Hazardous Components (Chemical Name)	S. 302 (EHS)	S. 304 RQ	S. 313 (TRI)
16142-27-1	SIN-1 Chloride	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
16142-27-1	SIN-1 Chloride	CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No

Regulatory Information Statement: This SDS was prepared in accordance with 29 CFR 1910.1200 and Regulation (EC) No.1272/2008.

Section 16. Other Information

Revision Date: 12/19/2018

Additional Information About This Product: No data available.

Company Policy or Disclaimer: DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

SAFETY DATA SHEET

Version 6.4
Revision Date 03/08/2024
Print Date 05/12/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Chlorobenzene-$^{13}C_6$

Product Number : 488534
Brand : Aldrich
Index-No. : 602-033-00-1
CAS-No. : 287389-52-0

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

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Pictogram



Signal Word Warning

Hazard Statements

H226	Flammable liquid and vapor.
H332	Harmful if inhaled.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing mist or vapors.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$^{13}C_6H_5Cl$
Molecular weight	:	118.45 g/mol
CAS-No.	:	287389-52-0
Index-No.	:	602-033-00-1

Component	Classification	Concentration
Chlorobenzene-13C6		
	Flam. Liq. 3; Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H226, H332, H401, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. If breathing stops: mouth-to-mouth breathing or artificial respiration. Oxygen if necessary. Immediately call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

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5.4 Further information

Remove container from danger zone and cool with water. Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Chlorobenzene-13C6	287389-52-0	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		TWA	75 ppm 350 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	10 ppm 46 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Chlorobenzene-13C6	287389-52-0	4-Chlorocatechol	100mg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		p-Chlorophenol	20mg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
required

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type ABEK

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The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -45 °C (-49 °F) - lit.
f)	Initial boiling point and boiling range	132 °C 270 °F - lit.
g)	Flash point	23.9 °C (75.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.164 g/mL at 25 °C (77 °F)1.164 g/cm3 at 25 °C (77 °F)
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5.0
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

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s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
LC50 Inhalation - 4.0 h - 11.0 mg/l - vapor

Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

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NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Incoordination., To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)
UN number: 1134 Class: 3 Packing group: III
Proper shipping name: Chlorobenzene
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1134 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: CHLOROBENZENE
Marine pollutant : yes

IATA
UN number: 1134 Class: 3 Packing group: III
Proper shipping name: Chlorobenzene

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Chlorobenzene-13C6	287389-52-0	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Reportable Quantity : D021 lbs

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Chlorobenzene-13C6	287389-52-0	2007-07-01

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SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.4 Revision Date: 03/08/2024 Print Date: 05/12/2024

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SAFETY DATA SHEET

Version 6.11
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Chloroform

Product Number : 288306
Brand : Sigma-Aldrich
Index-No. : 602-006-00-4
CAS-No. : 67-66-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 4), H302
Acute toxicity, Inhalation (Category 3), H331
Skin irritation (Category 2), H315

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Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - repeated exposure, Oral (Category 1), Liver, Kidney, H372
Short-term (acute) aquatic hazard (Category 3), H402

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word: Danger

Hazard Statements

H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs (Liver, Kidney) through prolonged or repeated exposure if swallowed.
H402	Harmful to aquatic life.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe mist or vapors.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal

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plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Trichloromethane
Methylidyne trichloride

Formula : $CHCl_3$
Molecular weight : 119.38 g/mol
CAS-No. : 67-66-3
EC-No. : 200-663-8
Index-No. : 602-006-00-4

Component	Classification	Concentration
Chloroform		
	Acute Tox. 4; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; Repr. 2; STOT SE 3; STOT RE 1; Aquatic Acute 3; H302, H331, H315, H319, H351, H361, H336, H372, H402 Concentration limits: 20 %: STOT SE 3, H336;	<= 100 %

ethanol		
	Flam. Liq. 2; Eye Irrit. 2A; H225, H319 Concentration limits: >= 50 %: Eye Irrit. 2A, H319;	>= 1 - < 5 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

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In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

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6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling

Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures

Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions

Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class

Storage class (TRGS 510): 6.1D: Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Chloroform	67-66-3	TWA	10 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		ST	2 ppm 9.78 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen		

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		C	50 ppm 240 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	2 ppm 9.78 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
ethanol	64-17-5	TWA	1,000 ppm 1,900 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	1,000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans		
		TWA	1,000 ppm 1,900 mg/m3	USA. NIOSH Recommended Exposure Limits
		PEL	1,000 ppm 1,900 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.7 mm
Break through time: 10 min

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Material tested:Butoject® (KCL 898)

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type AX
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	sweet
c)	Odor Threshold	205 ppm
d)	pH	No data available
e)	Melting point/freezing point	Melting point: -64 °C (-83 °F)
f)	Initial boiling point and boiling range	60.5 - 61.5 °C 140.9 - 142.7 °F at 1,013.25 hPa
g)	Flash point	() - Regulation (EC) No. 440/2008, Annex, A.9does not flash
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	210 hPa at 20 °C (68 °F)
l)	Vapor density	4.12 - (Air = 1.0)
m)	Density	1.49 g/cm3 at 25 °C (77 °F)
	Relative density	No data available
n)	Water solubility	8.7 g/l at 23 °C (73 °F) - OECD Test Guideline 105 - soluble
o)	Partition coefficient: n-octanol/water	No data available

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p)	Autoignition temperature	No data available
q)	Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information

Solubility in other solvents	organic solvent at 20 °C (68 °F) - miscible
Relative vapor density	4.12 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

No data available

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .
Contains the following stabilizer(s):
ethanol (>=0.5 - <=1 %)

10.3 Possibility of hazardous reactions

Risk of explosion with:
Ammonia
Amines
nitrogen oxides
bases
Oxygen
alkali amides
organic nitro compounds
strong alkalis
Fluorine
peroxi compounds
Alkaline earth metals
Alkali metals
Powdered metals
Methanol
with
alcoholates
Methanol
with
strong alkalis
Iron
in powder form
various alloys

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sensitive to shock
Methanol
with
Sodium hydroxide
magnesium
in powder form
Oxygen
with
alkali compounds
Aluminum
in powder form
Acetone
with
alkali compounds
Potassium
sensitive to shock
sodium
sensitive to shock
Violent reactions possible with:
phosphines
bis(dimethylamino)dimethyl tin
nonmetallic hydrogen compounds
Powdered metals
Light metals
Ketones
mineral acids
Strong oxidizing agents
semimetallic hydrogen compounds

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 912.56 mg/kg
(Calculation method)
LD50 Oral - Rat - male - 908 mg/kg
(OECD Test Guideline 401)
Acute toxicity estimate Inhalation - 4 h - 3.12 mg/l - vapor(Calculation method)

LC50 Inhalation - Rat - 6 h - 9.17 mg/l - vapor

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Acute toxicity estimate Inhalation - Expert judgment - 4 h - 3.1 mg/l - vapor

Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin. - 24 h
Remarks: (ECHA)
Remarks: Drying-out effect resulting in rough and chapped skin.
Skin - Rabbit
Result: slight irritation
Remarks: (IUCLID)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Irritating to eyes.
Remarks: (ECHA)
Remarks: (Regulation (EC) No 1272/2008, Annex VI)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(Regulation (EC) No. 440/2008, Annex, B.6)

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Result: negative
Remarks: (ECHA)
Test Type: unscheduled DNA synthesis assay
Test system: Liver
Metabolic activation: without metabolic activation
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Rat
Cell type: Red blood cells (erythrocytes)
Application Route: Oral
Method: OECD Test Guideline 474
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Rat
Cell type: Liver cells
Application Route: Oral
Method: OECD Test Guideline 486
Result: negative

Test Type: in vivo assay
Species: Mouse

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Application Route: Inhalation

Result: negative
Remarks: (ECHA)

Carcinogenicity
Suspected of causing cancer.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Chloroform)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Chloroform)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
Oral - Causes damage to organs through prolonged or repeated exposure.
- Liver, Kidney

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - female - Oral - NOAEL (No observed adverse effect level) - 34 mg/kg

Vomiting, Cough, irritant effects, Shortness of breath, respiratory arrest, narcosis, Dizziness, Nausea, agitation, spasms, inebriation, Headache, Stomach/intestinal disorders, ataxia (impaired locomotor coordination), cardiovascular disorders
Drying-out effect resulting in rough and chapped skin.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Crassostrea gigas - 152.5 mg/l - 48 h Remarks: (ECHA)
Toxicity to algae	static test ErC50 - Chlamydomonas reinhardtii (green algae) - 13.3 mg/l - 72 h Remarks: (ECHA)

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Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 6.3 mg/l - 21 d Remarks: (ECHA)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1888 Class: 6.1 Packing group: III
Proper shipping name: ChloroformSOLUTION

Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1888 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: CHLOROFORMSOLUTION

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IATA
UN number: 1888 Class: 6.1 Packing group: III
Proper shipping name: ChloroformSOLUTION

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Chloroform	67-66-3	10	10
Chloroform	67-66-3	10	10 (D022)

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Chloroform	67-66-3	10	10

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)
Chloroform	67-66-3	10000

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Chloroform 67-66-3 >= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

Chloroform 67-66-3
ethanol 64-17-5

Pennsylvania Right To Know

Chloroform 67-66-3
ethanol 64-17-5

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including Chloroform, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

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TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.11 Revision Date: 09/06/2024 Print Date: 09/07/2024

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SAFETY DATA SHEET

Version 6.8
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Chromium

Product Number : 266299
Brand : Aldrich
CAS-No. : 7440-47-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

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SECTION 3: Composition/information on ingredients

3.1 Substances

Formula : Cr
Molecular weight : 52.00 g/mol
CAS-No. : 7440-47-3
EC-No. : 231-157-5

Component	Classification	Concentration
chromium		
		<= 100 %

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Chromium oxides

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

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5.4 Further information
none

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
No special precautionary measures necessary.

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Air sensitive.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
chromium	7440-47-3	TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		PEL	0.5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
chromium	7440-47-3	Total chromium	0.7 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our

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customers. It should not be construed as offering an approval for any specific use scenario.

Respiratory protection
Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
No special precautionary measures necessary.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Color: light gray
b)	Odor	odorless
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 1,857 °C (3,375 °F) - lit.
f)	Initial boiling point and boiling range	2,672 °C 4,842 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	7.14 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances

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p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity

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No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: GB4200000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 14.3 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.07 mg/l - 48 h

12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Bioaccumulation	Oncorhynchus mykiss (rainbow trout) - 30 d - 50 µg/l(chromium)
	Bioconcentration factor (BCF): 1.03 - 1.22

12.4 Mobility in soil

No data available

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12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 3077 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (chromium)

Reportable Quantity (RQ): 5000 lbs

Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

Further information

Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
chromium	7440-47-3	5000	5000

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SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

chromium	7440-47-3	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

chromium	7440-47-3

Pennsylvania Right To Know

chromium	7440-47-3

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

Based on Directive 2001/58/EC of the Commission of the European Communities

CHRYSENE

1. Identification of the substance/preparation and of the company/undertaking

1.1 Identification of the substance or preparation:

Synonyms: none
CAS No. : 218-01-9
EC index No. : 601-048-00-0
EINECS No. : 205-923-4
RTECS No. : GC0700000
BCR number : BCR-269
NFPA code : N.D.
Molecular weight : 228.30
Formula : C18H12

1.2 Use of the substance or the preparation:
Certified reference material for laboratory use only

1.3 Company/undertaking identification:
Institute for Reference Materials and Measurements
Retieseweg
B-2440 Geel
Tel. : +32 14 57 12 11
Fax : +32 14 58 42 73

1.4 Telephone number for emergency:
+32 70 245 245
Antigifcentrum
p/a Militair Hospitaal Koningin Astrid, Bruynstraat, B-1120 Brussel

2. Composition/information on ingredients

Hazardous ingredients	CAS No. EINECS No.	Conc. in %	Hazard symbol	Risks (R-phrases)
chrysene	218-01-9 205-923-4	100	T;N	45-50/53 (1)

(1) For R-phrases in full: see heading 16

3. Hazards identification

- May cause cancer
- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

4. First aid measures

4.1 Eye contact:
- Consult a doctor/medical service if irritation persists
- Rinse immediately with water

4.2 Skin contact:
- Consult a doctor/medical service if irritation persists
- Wash with water and soap
- Wipe off dry product from skin
- Remove clothing before washing

4.3 After inhalation:
- Consult a doctor/medical service if breathing problems develop
- Remove the victim into fresh air
- Unconscious: maintain adequate airway and respiration

4.4 After ingestion:
- Consult a doctor/medical service if you feel unwell
- Immediately give lots of water to drink
- Never give water to an unconscious person

- Do not induce vomiting

5. Fire-fighting measures

5.1 Suitable extinguishing media:
- Water spray
- Alcohol foam
- Polymer foam
- ABC powder
- Carbon dioxide

5.2 Unsuitable extinguishing media:
- Solid water jet ineffective as extinguishing medium

5.3 Special exposure hazards:
- Not easily combustible
- Upon combustion CO and CO2 are formed

5.4 Instructions:
- Take account of toxic firefighting water
- Use firefighting water moderately and contain it

5.5 Special protective equipment for firefighters:
- Heat/fire exposure: compressed air/oxygen apparatus
- Dust cloud production: compressed air/oxygen apparatus

6. Accidental release measures

6.1 Personal protection/precautions: see heading 8.1/8.3/10.3

6.2 Environmental precautions:
- Prevent soil and water pollution
- Substance must not be discharged into the sewer
- Dam up the solid spill

6.3 Methods for cleaning up:
- Stop dust cloud by covering with sand/earth
- Carefully collect the spill/leftovers
- Scoop solid spill into closing containers
- Spill must not return in its original container
- Take collected spill to manufacturer/competent authority
- Clean contaminated surfaces with an excess of water
- Wash clothing and equipment after handling

7. Handling and storage

7.1 Handling:
- Observe strict hygiene
- Avoid prolonged and repeated contact with skin
- Avoid raising dust
- Do not discharge the waste into the drain
- Remove contaminated clothing immediately

7.2 Storage:
- Keep container tightly closed. Store only in a limited quantity. Store in a dry area. Store in a dark area.
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

Storage temperature	:	N.D.	**°C**
Quantity limits	:	N.D.	**kg**
Storage life	:	N.D.	
Materials for packaging	:		

- suitable : no data available
- to avoid : no data available

7.3 Specific uses:
- See information supplied by the manufacturer

8. Exposure controls/Personal protection

8.1 Exposure limit values:

TLV-TWA	:	not listed
TLV-STEL	:	not listed
TLV-Ceiling	:	not listed
OES-LTEL	:	not listed
OES-STEL	:	not listed
MEL-LTEL	:	not listed
MEL-STEL	:	not listed
MAK	:	not listed
TRK	:	not listed
MAC-TGG 8 h	:	not listed
MAC-TGG 15 min.	:	not listed
MAC-Ceiling	:	not listed
VME-8 h	:	not listed
VLE-15 min.	:	not listed
GWBB-8 h	:	not listed
GWK-15 min.	:	not listed
Momentary value	:	not listed
EC	:	not listed
EC-STEL	:	not listed

Sampling methods:

- Chrysene (Polynuclear aromatic Hydrocarbons)	NIOSH 5515
- Chrysene	OSHA 58
- Chrysene (Polynuclear aromatic Hydrocarbons)	NIOSH 5506

8.2 Exposure controls:

8.2.1 Occupational exposure controls:
- Measure the concentration in the air regularly
- Work under local exhaust/ventilation

8.2.2 Environmental exposure controls: see heading 13

8.3 Personal protection:

8.3.1 respiratory protection:
- Dust production: dust mask with filter type P3
- High dust production: compressed air/oxygen apparatus

8.3.2 hand protection:
- Gloves
  Suitable materials: No data available

- Breakthrough time: N.D.

8.3.3 eye protection:
- Safety glasses
- In case of dust production: protective goggles

8.3.4 skin protection:
- Protective clothing
- In case of dust production: head/neck protection
  Suitable materials: No data available

9. Physical and chemical properties

9.1 General information:

Appearance (at 20°C)	:	Crystalline solid / Flakes
Odour	:	Odourless
Colour	:	White

9.2 Important health, safety and environmental information:

pH value	:	N.D.	
Boiling point/boiling range	:	448	**°C**
Flashpoint	:	N.D.	**°C**
Explosion limits	:	N.D.	**vol%** (**°C**)
Vapour pressure (at 20°C)	:	N.D.	**hPa**
Vapour pressure (at 50°C)	:	N.D.	**hPa**
Relative density (at 20°C)	:	1.27	
Water solubility	:	< 0.001	**g/100 ml**
Soluble in	:	N.D.	
Relative vapour density	:	N.D.	
Viscosity	:	N.D.	**Pa.s**
Partition coëfficient n-octanol/water	:	5.61/5.73	
Evaporation rate			
ratio to butyl acetate	:	N.D.	
ratio to ether	:	N.D.	

9.3 Other information:

Melting point/melting range	:	256	**°C**
Auto-ignition point	:	N.D.	**°C**
Saturation concentration	:	N.D.	**g/m^3**

10. Stability and reactivity

10.1 Conditions to avoid/reactivity:
- Stable under normal conditions

10.2 Materials to avoid:
- Keep away from: heat sources, ignition sources, oxidizing agents, acids

10.3 Hazardous decomposition products:
- Upon combustion CO and CO2 are formed
- Reacts violently with (strong) oxidizers
- Decomposes on exposure to (strong) acids

11. Toxicological information

11.1 Acute toxicity:

LD50 oral rat	:	N.D.	**mg/kg**
LD50 dermal rat	:	N.D.	**mg/kg**
LD50 dermal rabbit	:	N.D.	**mg/kg**
LC50 inhalation rat	:	N.D.	**mg/1/4 h**
LC50 inhalation rat	:	N.D.	**ppm/4 h**

11.2 Chronic toxicity:

EC carc. cat.	:	2
EC muta. cat.	:	3
EC repr. cat.	:	not listed
Carcinogenicity (TLV)	:	A3
Carcinogenicity (MAC)	:	K
Carcinogenicity (VME)	:	not listed
Carcinogenicity (GWBB)	:	not listed
Carcinogenicity (MAK)	:	2
Mutagenicity (MAK)	:	not listed
Teratogenicity (MAK)	:	-
IARC classification	:	3

11.3 Routes of exposure: ingestion, inhalation, eyes and skin
Caution! Substance is absorbed through the skin

11.4 Acute effects/symptoms:

AFTER SKIN CONTACT
- Slight irritation

11.5 Chronic effects:

- Probably human carcinogenic
- No certainty about human mutagenic properties

ON CONTINUOUS/REPEATED EXPOSURE/CONTACT:
- No specific information available

SIMILAR PRODUCTS CAUSE FOLLOWING SYMPTOMS:
- Feeling of weakness
- Photoallergy
- Cracking of the skin
- Skin rash/inflammation
- Skin cancer
- Lung tissue affection/degeneration
- Enlargement/affection of the liver
- Affection of the renal tissue

12. Ecological information

12.1 Ecotoxicity:

- LC50 (24 h) : 0.0007 mg/l (DAPHNIA MAGNA)
- LC50 (24 h) : >6.7 mg/l (RANA SP.)

12.2 Mobility:

- **Volatile organic compounds (VOC):** N.D.%

- Forming sediments in water
- Adsorbs into the soil
- Insoluble in water

For other physicochemical properties see heading 9.

12.3 Persistence and degradability:

- **biodegradation BOD_5** : N.D. **% ThOD**
- **water** : - Not readily biodegradable in water
- **soil** : **T ½:** > 77 **days**

12.4 Bioaccumulative potential:
- **log P_{ow}** : 5.61/5.73
- **BCF** : 4440 (LAMELLIBRANCHIATA)
- Highly bioaccumulative

12.5 Other adverse effects:

- **WGK** : 3 (Classification based on the R-phrases in compliance with Verwaltungsvorschrift wassergefährdender Stoffe (VwVwS) of 17 May 1999)
- **Effect on the ozone layer** : Not dangerous for the ozone layer (Council Regulation (EC) 3093/94)
- **Greenhouse effect** : no data available
- **Effect on waste water purification** : no data available

13. Disposal considerations

13.1 Provisions relating to waste:

- Waste material code (91/689/EEC, Council Decision
- 2001/118/EC, O.J. L47 of 16/2/2001): 16 05 06 (laboratory chemicals, consisting of or containing dangerous substances, including mixtures of laboratory)
- Waste material code (Flanders): 001, 045, 691
- Waste code (Germany): 59302
- Hazardous waste (91/689/EEC)

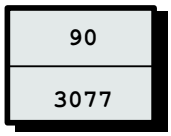
13.2 Disposal methods:

- Dissolve or mix with a combustible solvent
- Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber
- Do not discharge into surface water (2000/60/EEC, Council

13.3 Packaging/Container:

- Waste material code packaging (91/689/EEC, Council Decision
- 2001/118/EC, O.J. L47 of 16/2/2001): 15 01 10 (packaging containing residues of or contaminated by dangerous substances)

14. Transport information



14.1 Classification of the substance in compliance with UN Recommendations

UN number	: 3077
CLASS	: 9
SUB RISKS	: -
PACKING	: III
PROPER SHIPPING NAME	: UN 3077, Environmentally hazardous substance, solid, n.o.s. (chrysene)

14.2 ADR (transport by road)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.3 RID (transport by rail)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.4 ADNR (transport by inland waterways)

CLASS	: 9
PACKING	: III
DANGER LABEL TANKS	: 9
DANGER LABEL PACKAGES	: 9

14.5 IMDG (maritime transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
MFAG	: -
EMS	: -
MARINE POLLUTANT	: P

14.6 ICAO (air transport)

CLASS	: 9
SUB RISKS	: -
PACKING	: III
PACKING INSTRUCTIONS PASSENGER AIRCRAFT	:
PACKING INSTRUCTIONS CARGO AIRCRAFT	:

14.7 Special precautions in connection with transport : none

14.8 Limited quantities (LQ) :

When substances and their packaging meet the conditions established by ADR/RID/ADNR in chapter 3.4, **only** the following prescriptions shall be complied with:
each package shall display a diamond-shaped figure with the following inscription:
- 'UN 3077'
or, in the case of different goods with different identification numbers within a single package:
- the letters 'LQ'

15. Regulatory information

Enumerated in substance list Annex I of directive 67/548/EEC et sequens



Toxic



Dangerous for the environment

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

S53 : Avoid exposure - obtain special instructions before use
S45 : In case of accident or if you feel unwell, seek medical advice (show the label where possible)
S60 : This material and/or its container must be disposed of as hazardous waste
S61 : Avoid release to the environment. Refer to special instructions/safety data sheets.

16. Other information

The information provided on this MSDS is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

N.A. = NOT APPLICABLE
N.D. = NOT DETERMINED
***** = INTERNAL CLASSIFICATION

Full text of any R-phrases referred to under heading 2:

R45 : May cause cancer
R50/53 : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment

Exposure limits:
TLV : Threshold Limit Value - ACGIH USA 2000
OES : Occupational Exposure Standards - United Kingdom 1999
MEL : Maximum Exposure Limits - United Kingdom 1999
MAK : Maximale Arbeitsplatzkonzentrationen - Germany 2001
TRK : Technische Richtkonzentrationen - Germany 2001
MAC : Maximale aanvaarde concentratie - The Netherlands 2002
VME : Valeurs limites de Moyenne d'Exposition - France 1999
VLE : Valeurs limites d'Exposition à court terme - France 1999
GWBB : Grenswaarde beroepsmatige blootstelling - Belgium 1998
GWK : Grenswaarde kortstondige blootstelling - Belgium 1998
EC : Indicative occupational exposure limit values - directive 2000/39/EC

Chronic toxicity:
K : List of the carcinogenic substances and processes - The Netherlands 2002

SAFETY DATA SHEET

Version 5.4
Revision Date 12/01/2015
Print Date 03/03/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *cis*-1,2-Dichloroethylene

Product Number : D62004
Brand : Aldrich
Index-No. : 602-026-00-3

CAS-No. : 156-59-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H332 Harmful if inhaled.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.

P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	cis-Acetylene dichloride
Formula	:	$C_2H_2Cl_2$
Molecular weight	:	96.94 g/mol
CAS-No.	:	156-59-2
EC-No.	:	205-859-7
Index-No.	:	602-026-00-3

Hazardous components

Component	Classification	Concentration
cis-Dichloroethylene		
	Flam. Liq. 2; Acute Tox. 4; Aquatic Acute 3; Aquatic Chronic 3; H225, H332, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Handle and store under inert gas. Air and moisture sensitive. Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
cis-Dichloroethylene	156-59-2	TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Eye irritation		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -80 °C (-112 °F) - lit.
f)	Initial boiling point and boiling range	60 °C (140 °F) - lit.
g)	Flash point	6.0 °C (42.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.284 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available

p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LC50 Inhalation - Rat - 13700 ppm
Remarks: Behavioral:Somnolence (general depressed activity). Liver:Fatty liver degeneration.

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KV9420000

narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

Poison Inhalation Hazard: No

IMDG
UN number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,2-DICHLOROETHYLENE

IATA
UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
cis-Dichloroethylene	156-59-2	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H332	Harmful if inhaled.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information
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Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.4 Revision Date: 12/01/2015 Print Date: 03/03/2016

SAFETY DATA SHEET

Version 6.12
Revision Date 09/08/2024
Print Date 09/09/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Cobalt

Product Number : 266647
Brand : Aldrich
Index-No. : 027-001-00-9
CAS-No. : 7440-48-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable solids (Category 1), H228
Eye irritation (Category 2A), H319
Respiratory sensitization (Category 1), H334

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Skin sensitization (Category 1), H317
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Reproductive toxicity (Category 1B), H360
Long-term (chronic) aquatic hazard (Category 4), H413

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word: Danger

Hazard Statements

H228	Flammable solid.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H360	May damage fertility or the unborn child.
H413	May cause long lasting harmful effects to aquatic life.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P261	Avoid breathing dust.
P264	Wash skin thoroughly after handling.
P272	Contaminated work clothing must not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P285	In case of inadequate ventilation wear respiratory protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P341	IF INHALED: If breathing is difficult, remove person to fresh air and keep comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P342 + P311	If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.
P363	Wash contaminated clothing before reuse.

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P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Co
Molecular weight	:	58.93 g/mol
CAS-No.	:	7440-48-4
EC-No.	:	231-158-0
Index-No.	:	027-001-00-9

Component	Classification	Concentration
Cobalt		
	Flam. Sol. 1; Eye Irrit. 2A; Resp. Sens. 1; Skin Sens. 1; Muta. 2; Carc. 1B; Repr. 1B; Aquatic Chronic 4; H228, H319, H334, H317, H341, H350, H360, H413	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

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4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Cobalt/cobalt oxides
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Air sensitive. Handle and store under inert gas.

Storage class
Storage class (TRGS 510): 4.1B: Flammable solid hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Cobalt	7440-48-4	TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	0.02 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		TWA	0.005 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Respiratory sensitization Suspected human carcinogen		

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		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Dermal Sensitization Respiratory sensitization Confirmed animal carcinogen with unknown relevance to humans		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Cobalt	7440-48-4	Cobalt	15 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		Cobalt		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
Flame retardant antistatic protective clothing.

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Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	2,900 °C 5,252 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 1.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	8.9 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5.0
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available

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r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Oxidizing agents, Mineral acidsAcetylene, Hydrazinium nitrate, Material readily reacts with acids generating flammable and/or explosive hydrogen gas.

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 6,171 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).
Behavioral:Ataxia.
Diarrhea
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Causes serious eye irritation.
(OECD Test Guideline 405)

Respiratory or skin sensitization
May cause allergic respiratory and skin reactions

Germ cell mutagenicity

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Suspected of causing genetic defects.

Carcinogenicity
Presumed to have carcinogenic potential for humans

IARC: 2A - Group 2A: Probably carcinogenic to humans (Cobalt)

2A - Group 2A: Probably carcinogenic to humans (Cobalt)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
May damage fertility.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: GF8750000
Kidney injury may occur., Damage to the eyes., Lung irritation, Throat., Rash, Vomiting, Diarrhea
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Danio rerio (zebra fish) - 100.01 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - > 100 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - 0.270 mg/l - 70 h (OECD Test Guideline 201)

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

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12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 3089 Class: 4.1 Packing group: II
Proper shipping name: Metal powders, flammable, n.o.s.
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG

UN number: 3089 Class: 4.1 Packing group: II EMS-No: F-G, S-G
Proper shipping name: METAL POWDER, FLAMMABLE, N.O.S.

IATA

UN number: 3089 Class: 4.1 Packing group: II
Proper shipping name: Metal powder, flammable, n.o.s.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

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SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Cobalt	7440-48-4	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

Cobalt	7440-48-4

Pennsylvania Right To Know

Cobalt	7440-48-4

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Cobalt	7440-48-4

Washington Chemicals of High Concern

Cobalt	7440-48-4

California Prop. 65

WARNING: This product can expose you to chemicals including Cobalt, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.12 Revision Date: 09/08/2024 Print Date: 09/09/2024

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SAFETY DATA SHEET

Version 6.9
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Copper

Product Number : 349178
Brand : Aldrich
Index-No. : 029-024-00-X
CAS-No. : 7440-50-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

No hazard pictogram, no signal word, no hazard statement(s), no precautionary statement(s) required.

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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Cu
Molecular weight	:	63.55 g/mol
CAS-No.	:	7440-50-8
EC-No.	:	231-159-6
Index-No.	:	029-024-00-X

Component	Classification	Concentration
Copper(bulk)		
		<= 100 %

SECTION 4: First aid measures

4.1 Description of first-aid measures

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

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5.2 Special hazards arising from the substance or mixture
Copper oxides
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
In the event of fire, wear self-contained breathing apparatus.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert. For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Store under inert gas. Air sensitive.

Storage class
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Copper(bulk)	7440-50-8	TWA	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	0.2 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.1 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		PEL	0.1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm

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Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Respiratory protection
Recommended Filter type: Filter type P2
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Foil
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 1,083.4 °C (1,982.1 °F) - lit.
f)	Initial boiling point and boiling range	2,567 °C 4,653 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	8.94 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition	No data available

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	temperature	
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Exothermic reaction with:
Ethylene oxide
Fluorine
hydrogen sulphide
halogen-halogen compounds
alkali oxides
nitrides
Salts of hydrazine
Sulfuric acid
Risk of ignition or formation of inflammable gases or vapours with:
Oxidizing agents
Chlorine
Risk of explosion with:
Acetylene
azides
ammonium compounds
iodates
bromopropine
perchlorates
bromates
picrates
chlorates
Peroxides

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

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10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: GL5325000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

Further information
Not classified as dangerous in the meaning of transport regulations.

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SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know

Copper(bulk) 7440-50-8

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its

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Version: 6.9 Revision Date: 09/07/2024 Print Date: 09/08/2024

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 7.5
Revision Date 04.03.2024
Print Date 16.09.2024
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Cumene
Product Number	:	C87657
Brand	:	Aldrich
Index-No.	:	601-024-00-X
REACH No.	:	A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.
CAS-No.	:	98-82-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Inc. 3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES
Telephone	:	+1 314 771-5765
Fax	:	+1 800 325-5052

1.4 Emergency telephone

Emergency Phone #	:	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Flammable liquids, (Category 3)	H226: Flammable liquid and vapor.
Carcinogenicity, (Category 1B)	H350: May cause cancer.

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Specific target organ toxicity - single exposure, (Category 3), Respiratory system	H335: May cause respiratory irritation.
Aspiration hazard, (Category 1)	H304: May be fatal if swallowed and enters airways.
Long-term (chronic) aquatic hazard, (Category 2)	H411: Toxic to aquatic life with long lasting effects.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

Pictogram



Signal Word	Danger
Hazard Statements	
H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H335	May cause respiratory irritation.
H350	May cause cancer.
H411	Toxic to aquatic life with long lasting effects.
Precautionary Statements	
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233	Keep container tightly closed.
P273	Avoid release to the environment.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P331	Do NOT induce vomiting.
Supplemental Hazard Statements	none

Reduced Labeling (<= 125 ml)

Pictogram



Signal Word	Danger
Hazard Statements	
H350	May cause cancer.
H304	May be fatal if swallowed and enters airways.
Precautionary Statements	
P202	Do not handle until all safety precautions have been read and understood.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P331	Do NOT induce vomiting.

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Supplemental Hazard Statements none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
Toxicological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
May form explosive peroxides.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Isopropylbenzene

Formula : C_9H_{12}
Molecular weight : 120,19 g/mol
CAS-No. : 98-82-8
EC-No. : 202-704-5
Index-No. : 601-024-00-X

Component		Classification	Concentration
cumene			
CAS-No. EC-No. Index-No.	98-82-8 202-704-5 601-024-00-X	Flam. Liq. 3; Carc. 1B; STOT SE 3; Asp. Tox. 1; Aquatic Chronic 2; H226, H350, H335, H304, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

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In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

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6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition. Keep locked up or in an area accessible only to qualified or authorized persons.

Store under inert gas.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please

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contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0,7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0,4 mm
Break through time: 10 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Physical state	liquid, clear
b)	Color	colorless
c)	Odor	aromatic
d)	Melting point/freezing point	Melting point/range: -96 °C - lit.
e)	Initial boiling point and boiling range	152 - 154 °C - lit.
f)	Flammability (solid, gas)	No data available
g)	Upper/lower flammability or explosive limits	Upper explosion limit: 6,0 %(V) Lower explosion limit: 0,9 %(V)
h)	Flash point	31,0 °C - closed cup

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i)	Autoignition temperature	425,0 °C
j)	Decomposition temperature	No data available
k)	pH	Not applicable
l)	Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: 0,79 mPa.s at 20 °C
m)	Water solubility	ca.0,05 g/l at 25 °C - slightly soluble
n)	Partition coefficient: n-octanol/water	log Pow: 3,55 at 23 °C - Bioaccumulation is not expected.
o)	Vapor pressure	11 hPa at 20,0 °C
p)	Density	0,864 g/mL at 25 °C - lit.
	Relative density	No data available
q)	Relative vapor density	No data available
r)	Particle characteristics	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Surface tension	27,69 mN/m at 25 °C

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

Heating.

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

In the event of fire: see section 5

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Symptoms: gastric pain, Vomiting
Symptoms: mucosal irritations, Cough, Shortness of breath, Headache, Nausea, Vomiting,
Possible damages:, damage of respiratory tract
Dermal: No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)
Remarks: Drying-out effect resulting in rough and chapped skin.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation - 72 h
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: negative
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: unscheduled DNA synthesis assay
Test system: rat hepatocytes
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 482
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Red blood cells (erythrocytes)
Application Route: inhalation (gas)
Method: OECD Test Guideline 474
Result: negative

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Test Type: Micronucleus test
Species: Rat
Cell type: Bone marrow
Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: Positive results were obtained in some in vivo tests.

Carcinogenicity
Presumed to have carcinogenic potential for humans

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation. - Respiratory Tract
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
Aspiration may cause pulmonary edema and pneumonitis.

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

RTECS: GR8575000
narcosis, Central nervous system depression, Dermatitis, Gastrointestinal disturbance, Damage to the lungs., Liver injury may occur., Kidney injury may occur.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After uptake of large quantities:

somnolence
Dizziness
narcosis

Effect potentiated by: ethanol

Handle in accordance with good industrial hygiene and safety practice.

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SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Cyprinodon variegatus (sheepshead minnow) - 4,7 mg/l - 96 h (US-EPA)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 2,14 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - 2,01 mg/l - 72 h (OECD Test Guideline 201)
Toxicity to bacteria	static test EC50 - activated sludge - > 2.000 mg/l - 3 h (OECD Test Guideline 209)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 0,35 mg/l - 21 d (OECD Test Guideline 211)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 20 d Result: 70 % - Readily biodegradable. Remarks: (ECHA)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects

Discharge into the environment must be avoided.

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

No data available

SECTION 14: Transport information

14.1 UN number

ADR/RID: 1918 IMDG: 1918 IATA: 1918

14.2 UN proper shipping name

ADR/RID: ISOPROPYLBENZENE
IMDG: ISOPROPYLBENZENE
IATA: Isopropylbenzene

14.3 Transport hazard class(es)

ADR/RID: 3 IMDG: 3 IATA: 3

14.4 Packaging group

ADR/RID: III IMDG: III IATA: III

14.5 Environmental hazards

ADR/RID: yes IMDG Marine pollutant: yes IATA: no

14.6 Special precautions for user

Tunnel restriction code : (D/E)

Further information : No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Authorisations and/or restrictions on use

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII) : cumene

National legislation

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.

E2 ENVIRONMENTAL HAZARDS

P5c FLAMMABLE LIQUIDS

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Other regulations
Observe work restrictions regarding maternity protection in accordance to Dir 92/85/EEC or stricter national regulations where applicable.

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out

SECTION 16: Other information

Full text of H-Statements

H226	Flammable liquid and vapor.
H304	May be fatal if swallowed and enters airways.
H335	May cause respiratory irritation.
H350	May cause cancer.
H411	Toxic to aquatic life with long lasting effects.

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Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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AccuStandard, Inc.
125 Market St., New Haven, CT 06513 USA
Tel: 203-786-5290 Fax: 203-786-5287

SAFETY DATA SHEET

SECTION 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

1.1 - Product Identifiers

Catalog Name: WC-CN-1X-1

Description: Cyanide Standard

1.2 - Relevant Identified Uses of the Substance or Mixture

Laboratory Chemical Reference Material

1.3 - Supplier Details

Company: AccuStandard, Inc.
125 Market St.
New Haven, CT 06513 USA

Telephone Number: 203-786-5290

Fax: 203-786-5287

Email: edocs@accustandard.com

1.4 - Emergency Telephone Number

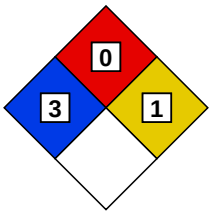
Emergency Phone #: AccuStandard, Inc.
1-203-502-7070 (USA)
+001-203-502-7070 (International)

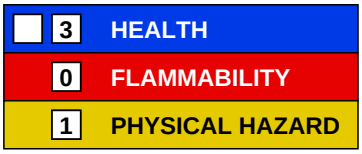
24 hours / 7 days a week

SECTION 2 - HAZARDS IDENTIFICATION

2.1 - GHS Label Elements







Signal Word: Danger

Hazard Codes:

H302 - Harmful if swallowed. (Acute toxicity, oral, category 4)

H314 - Causes skin burns. (Skin corrosion/irritation, category 1)

H318 - Causes serious eye damage. (Eye damage/irritation, category 1)

H332 - Harmful if inhaled. (Acute toxicity, inhalation, category 4)

Precautionary Codes:

P202 - This product should only by used by persons trained in the safe handling of hazardous chemicals.

P233 - Store in a tightly closed container. (P404)

P262 - Do not get in eyes, on skin or clothing.

P264 - Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available.

P280 - Protective gloves must be worn to prevent skin contact.

SECTION 2 - HAZARDS IDENTIFICATION *- continued*

2.1 - GHS Label Elements *- continued*

P284 - Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), or a risk assessment shows air-purifying respirators are appropriate, use of a NIOSH/MSHA approved air supplied respirator is advised. Use a full-face respirator with multi-purpose combination (US) or type ABEK (EN14387) respirator cartridges in absence of proper environmental control. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Engineering and/or administrative controls should be implemented to reduce exposure.

P331 - Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Give victim a glass of water a little at a time. Never give anything by mouth to an unconscious person. If vomiting occurs spontaneously, lower head below waist to prevent fluid from entering the lungs.

P338 - Eye contact: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers.

P360 - Skin contact: Immediately flush skin with plenty amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Thoroughly wash (or discard) clothing and shoes before reuse.

2.2 - Other Hazards

2.2.1 - Symptom of Exposure Health/Environment

Corrosive.

May cause stomach cramps and gastro-intestinal disturbances.

May cause burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea and vomiting.

2.2.2 - Potential Health Effects

Causes serious eye damage. (Eye damage/irritation, category 1)

Causes skin burns. (Skin corrosion/irritation, category 1)

May be harmful if absorbed through the skin. (Acute toxicity, dermal, category 5)

Extremely destructive to tissue of the mucous membranes and upper respiratory tract.

Harmful if inhaled. (Acute toxicity, inhalation, category 4)

Harmful if swallowed. (Acute toxicity, oral, category 4)

2.2.3 - Routes of Entry

Inhalation, ingestion or skin contact.

2.2.4 - Carcinogenicity

This product is or contains a component that is not listed (ACGIH, IARC, NTP, OSHA) as a cancer causing agent.

SECTION 3 - COMPOSITION / ANALYTES DATA

Description: Cyanide Standard

			ACGIH -TLV (mg/m³)			OSHA -PEL (mg/m³)		
Analyte	CAS #	% Concentration	TWA	STEL	Skin	TWA	STEL	Skin
Potassium cyanide	151-50-8	0.025			X	5		X
Sodium hydroxide	1310-73-2	2.000	(C)2 (C)2			2		
Water	7732-18-5	97.975						

SECTION 4 - FIRST AID MEASURES

4.2 - Eye Contact

Eye contact: Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. (P338)

4.3 - Skin Contact

Skin contact: Immediately flush skin with plenty amounts of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention immediately. Thoroughly wash (or discard) clothing and shoes before reuse. (P360)

4.4 - Inhalation

Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Seek immediate medical attention.

4.5 - Ingestion

Ingestion: Do NOT induce vomiting. Call a physician or poison control center immediately. Give victim a glass of water a little at a time. Never give anything by mouth to an unconscious person. If vomiting occurs spontaneously, lower head below waist to prevent fluid from entering the lungs. (P331)

SECTION 5 - FIRE FIGHTING MEASURES

5.1 - Flammable Properties

During a fire, irritating and highly toxic gases may be generated by thermal decomposition or combustion.

Reacts with most metals to form flammable hydrogen gas.

5.2 - Extinguishing Media

Do not use water.

Use dry chemical when fighting fires involving this material.

5.3 - Protection of Firefighters

As in any fire, wear self-contained breathing apparatus pressure demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

6.1 - Spill Response

Wear a self-contained breathing apparatus and appropriate Personal protection. Prevent contact with skin or eyes. Ventilate area. Stop leak if you can do so without risk. Absorb on sand or vermiculite, take up and containerize for proper disposal. Flush spill area with water. Comply with Federal, State, and local regulations.

SECTION 7 - HANDLING AND STORAGE

Store in a tightly closed container. (P404)

Keep refrigerated.

Avoid metal containers.

Material is hygroscopic.

Avoid inhalation.

Use with adequate ventilation.

Do not get in eyes, on skin or clothing. (P262)

Avoid prolonged or repeated exposure.

This product should only by used by persons trained in the safe handling of hazardous chemicals. (P202)

SECTION 8 - EXPOSURE CONTROLS

8.1 - Engineering Controls/PPE

Wash thoroughly after handling. Do not take internally. Eye wash and safety equipment should be readily available. (P264)

8.2 - General Hygene Considerations

Respiratory Protection: If workplace exposure limit(s) of product or any component is exceeded (see TLV/PEL), or a risk assessment shows air-purifying respirators are appropriate, use of a NIOSH/MSHA approved air supplied respirator is advised. Use a full-face respirator with multi-purpose combination (US) or type ABEK (EN14387) respirator cartridges in absence of proper environmental control. Always use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Engineering and/or administrative controls should be implemented to reduce exposure.

Material should be handled or transferred in an approved fume hood or with adequate ventilation.

Protective gloves must be worn to prevent skin contact. (P280)

(Chloroprene, natural rubber, nitrile, or equivalent)

Wear safety glasses with side shields (or googles) and a face shield.

Use eye protection tested and approved under the appropriate government standards such as NIOSH (US) or EN 166 (EU).

All recommendations are advisory only and must be evaluated by an industrial hygienist and/or safety officer familiar with the specific situation of anticipated use, such as concentration and amount of the substance in the workplace. Any recommendation should not be construed as offering an approval for any specific use of the product.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear liquid

Odor: Practically odorless

Odor Threshold: N/A

pH: 13-14

Melting Point: -4 °C (5% soln)

Boiling Point: 102 °C (5% soln)

Flash Point: N/A

Evaporation Rate (Butyl Acetate=1): N/A

Flammability Class: N/A

Lower Flammability Level: N/A

Upper Flammability Level: N/A

Vapor Pressure: N/A

Vapor Density (Air = 1): >1 g/l

Specific Gravity: 1.05 g/cm3 (5% soln)

Solubility in Water: Soluble

Partition Coefficient: N/A

Autoignition Temperature: N/A

Decomposition Temperature: N/A

Viscosity: N/A

VOC Content: N/A

Percent Volatile: N/A

SECTION 10 - STABILITY AND REACTIVITY

Stability: Stable

Materials to Avoid: Oxidizers
Acids

Hazardous Decomposition: Sodium oxides

Hazardous Polymerization: Will not occur

Condition to Avoid: Prolonged exposure to air

SECTION 11 - TOXICOLOGICAL INFORMATION

Human Health Toxicity

See section 2 for specific toxicological information for the ingredients of this product.

LD50 (Oral): N/A

LD50 (Dermal) : N/A

LC50 (Inhalation): N/A

No specific human health toxicity information is available for this product.

No other information related to the toxicological properties of this product is available at this time.

SECTION 12 - ECOLOGICAL INFORMATION

Environmental Toxicity

By complying with sections 6 and 7 there should be no release to the environment.

LC50 (Fish): N/A

EC50 (Aquatic Invertebrate): N/A

BCF: N/A

No specific environmental toxicity information is available for this product.

No other information related to the ecological properties of this product is available at this time.

SECTION 13 - DISPOSAL CONSIDERATIONS

Recycle or incinerate at any EPA approved facility or dispose in compliance with Federal, State and local regulations. Empty containers must be triple-rinsed prior to disposal.

SECTION 14 - TRANSPORT INFORMATION

Transportation Information (DOT/IATA)

UN Number: UN1824

Class: 8

Packing Group: III

Proper Shipping Name: Sodium hydroxide solution

Poison by Inhalation: No

Marine Pollutant: No

SECTION 15 - REGULATORY INFORMATION

This product does not contain compounds subject to EU Regulation (EC) No 1907/2006 (REACH) on Annex XIV, Annex XVII, and/or Article 59.

SECTION 15 - REGULATORY INFORMATION *- continued*

All components are listed on the TSCA Inventory.

For laboratory, research and development use only. Not for manufacturing or commercial purposes.

In addition to federal and state regulations, local regulations may apply. Check with your local regulatory authorities.

SECTION 16 - OTHER INFORMATION

This document has been designed to meet the requirements of OSHA, ANSI, GHS and CHIPs regulations. Chemicals are classified using the Globally Harmonized System for Classification and Labeling of Chemicals and CLP Regulation (EC) No. 1272/2008.

The statements contained herein are offered for informational purposes only and are based on technical data that we believe to be accurate. The manufacturer will not assume any liability for the accuracy and completeness of this information. Final determination of the suitability of the material is the responsibility of the user. Although certain hazards are described herein, the user should not presume that these are the only hazards that exist. Since conditions and manner of use are outside of the manufacturers control, we make

NO WARRANTY OF MERCHANTABILITY, EXPRESSED OR IMPLIED, AND ASSUME NO LIABILITY RESULTING FROM ITS USE.

Legend : N/A = Not Available ND = Not Determined NR = Not Regulated

Alteration of any information contained herein without written permission from the manufacturer is strictly prohibited.

HMIS/NFPA HAZARD INDEX

0 - Minimal
1 - Slight
2 - Moderate
3 - Serious
4 - Severe

* - Additional Hazard

GHS HAZARD INDEX

Category 1 - Most Severe
Category 5 - Least Severe

**** End of Document ****

SAFETY DATA SHEET

Version 5.8
Revision Date 03/07/2015
Print Date 02/23/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Cyclohexane

Product Number : 320633
Brand : Aldrich
Index-No. : 601-017-00-1

CAS-No. : 110-82-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H315 Causes skin irritation.
H336 May cause drowsiness or dizziness.
H400 Very toxic to aquatic life.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.

P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C_6H_{12}
Molecular weight	:	84.16 g/mol
CAS-No.	:	110-82-7
EC-No.	:	203-806-2
Index-No.	:	601-017-00-1

Hazardous components

Component	Classification	Concentration
Cyclohexane		
	Flam. Liq. 2; Skin Irrit. 2; STOT SE 3; Asp. Tox. 1; Aquatic Acute 1; H225, H304, H315, H336, H400	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Cyclohexane	110-82-7	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment		
		TWA	300.000000 ppm 1,050.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	300.000000 ppm 1,050.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 35 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 4 - 7 °C (39 - 45 °F) - lit.
f)	Initial boiling point and boiling range	80.7 °C (177.3 °F) - lit.
g)	Flash point	-17.99 °C (-0.38 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 9 %(V) Lower explosion limit: 1 %(V)
k)	Vapour pressure	225.0 hPa (168.8 mmHg) at 37.7 °C (99.9 °F) 102.7 hPa (77.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.779 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.44
p)	Auto-ignition temperature	260.0 °C (500.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

Vapours may form explosive mixture with air.

10.4 Conditions to avoid

Heat, flames and sparks.

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 12,705 mg/kg

LC50 Inhalation - Rat - 4 h - 34,000 mg/l
(OECD Test Guideline 403)

LD50 Dermal - Rabbit - > 2,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: GU6300000

Central nervous system depression, Drowsiness, Irritability, Dizziness, Gastrointestinal disturbance, Lung irritation, chest pain, pulmonary edema

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Pimephales promelas (fathead minnow) - 4.53 mg/l -

	96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 0.9 mg/l - 48 h (OECD Test Guideline 202)
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 3.4 mg/l - 72 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability Result: - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1145 Class: 3 Packing group: II
Proper shipping name: Cyclohexane
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1145 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: CYCLOHEXANE
Marine pollutant:yes

IATA

UN number: 1145 Class: 3 Packing group: II
Proper shipping name: Cyclohexane

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Cyclohexane	110-82-7	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Asp. Tox.	Aspiration hazard
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H400	Very toxic to aquatic life.
Skin Irrit.	Skin irritation
STOT SE	Specific target organ toxicity - single exposure

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.8 Revision Date: 03/07/2015 Print Date: 02/23/2016

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*

1 Identification

· **Product identifier**

· **Trade name: p,p'-DDE**
· **Synonym**
1,1'-(2,2-dichloroethenylidene)bis[4-chloro-benzene]
4,4'-DDE
4,4'-Dichlorodiphenyldichloroethylene
p,p'-Dichlorodiphenyldichloroethylene
NSC 1153

· **Article number:** 24241
· **CAS Number:**
72-55-9
· **EC number:**
200-784-6
· **Application of the substance / the mixture**
This product is for research use - Not for human or veterinary diagnostic or therapeutic use.

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Cayman Chemical Co.
1180 E. Ellsworth Rd.
Ann Arbor, MI 48108
USA

· **Information department:** Product safety department
· **Emergency telephone number:**
During normal opening times: +1 (734) 971-3335
US/CANADA: 800-424-9300
Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

· **Classification of the substance or mixture**


GHS06 Skull and crossbones

Acute Toxicity - Oral 3 H301 Toxic if swallowed.


GHS08 Health hazard

Carcinogenicity 2 H351 Suspected of causing cancer.

Specific Target Organ Toxicity - Repeated Exposure 1 H372 Causes damage to organs through prolonged or repeated exposure.

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GHS09 Environment

Aquatic Acute 1 H400 Very toxic to aquatic life.
Aquatic Chronic 1 H410 Very toxic to aquatic life with long lasting effects.

· **Label elements**
· **GHS label elements**
The substance is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**



GHS06 GHS08 GHS09

· **Signal word** Danger
· **Hazard statements**
H301 Toxic if swallowed.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.
· **Precautionary statements**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/fume/gas/mist/vapors/spray.
P264 Wash thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P280 Wear protective gloves/protective clothing/eye protection/face protection.
P301+P310 If swallowed: Immediately call a poison center/doctor.
P321 Specific treatment (see on this label).
P330 Rinse mouth.
P308+P313 IF exposed or concerned: Get medical advice/attention.
P314 Get medical advice/attention if you feel unwell.
P391 Collect spillage.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
· **Classification system:**
· **NFPA ratings (scale 0 - 4)**



Health = 1
Fire = 0
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = 1
Fire = 0
Reactivity = 0

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· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Substances**
· **CAS No. Description**
72-55-9 p,p'-DDE
· **Identification number(s)**
· **EC number:** 200-784-6

4 First-aid measures

· **Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Do not induce vomiting; immediately call for medical help.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed**
No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
Use fire fighting measures that suit the environment.
A solid water stream may be inefficient.
· **Special hazards arising from the substance or mixture** No further relevant information available.
· **Advice for firefighters**
· **Protective equipment:** No special measures required.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures** Not required.
· **Environmental precautions:**
Inform respective authorities in case of seepage into water course or sewage system.
Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to section 13.

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· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**
· **PAC-1:** 6.5 mg/m³
· **PAC-2:** 72 mg/m³
· **PAC-3:** 170 mg/m³

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7 Handling and storage

· **Handling:**
· **Precautions for safe handling** Thorough dedusting.
· **Information about protection against explosions and fires:** No special measures required.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:** Store in accordance with information listed on the product insert.
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** None.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see section 7.

· **Control parameters**
· **Components with limit values that require monitoring at the workplace:** Not required.
· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
· **Breathing equipment:**
In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer exposure use respiratory protective device that is independent of circulating air.
· **Protection of hands:**



Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the degradation
· **Material of gloves**
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.

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· **Penetration time of glove material**
The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
· **Eye protection:**



Tightly sealed goggles

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9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Solid
Color:	Not determined.
· **Odor:**	Characteristic
· **Structural Formula**	C14H8Cl4
· **Molecular Weight**	318 g/mol
· **Odor threshold:**	Not determined.
· **pH-value:**	Not applicable.
· **Change in condition**	
Melting point/Melting range:	Undetermined.
Boiling point/Boiling range:	Undetermined.
· **Flash point:**	Not applicable.
· **Flammability (solid, gaseous):**	Product is not flammable.
· **Decomposition temperature:**	Not determined.
· **Ignition temperature:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure:**	Not applicable.
· **Density:**	Not determined.
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water:	Not determined.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
SOLUBILITY	Chloroform: Slightly Soluble

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· **Other information** No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:**
No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** strong bases, strong oxidizing agents
· **Hazardous decomposition products:** carbon oxides, hydrogen chloride

11 Toxicological information

· **RTECS Number** KV9450000
· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
Oral	LD50	880 mg/kg (rat)
	Intraperitoneal LD50	500 µg/kg (mouse)
	Intraperitoneal LD50	159 mg/kg (rat)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**

· **Carcinogenic categories**
· **IARC (International Agency for Research on Cancer)** Substance is not listed.
· **NTP (National Toxicology Program)** Substance is not listed.
· **OSHA-Ca (Occupational Safety & Health Administration)** Substance is not listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Ecotoxical effects:**
· **Remark:** Very toxic for fish
· **Additional ecological information:**
· **General notes:**
Water hazard class 3 (Assessment by list): extremely hazardous for water
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
Also poisonous for fish and plankton in water bodies.

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Very toxic for aquatic organisms
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

14 Transport information

· **UN-Number**	
· **DOT, IMDG, IATA**	UN2811
· **UN proper shipping name**	
· **DOT**	Toxic solids, organic, n.o.s. (p,p'-DDE)
· **IMDG**	TOXIC SOLID, ORGANIC, N.O.S. (p,p'-DDE)
· **IATA**	Toxic solid, organic, n.o.s. (p,p'-DDE)
· **Transport hazard class(es)**	
· **DOT**	
· **Class**	6.1 Toxic substances
· **Label**	6.1
· **IMDG, IATA**	
· **Class**	6.1 Toxic substances
· **Label**	6.1
· **Packing group**	
· **DOT, IMDG, IATA**	III
· **Environmental hazards:**	Environmentally hazardous substance, solid
· **Special precautions for user**	Warning: Toxic substances
· **Hazard identification number (Kemler code):**	60
· **EMS Number:**	F-A,S-A

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· **Stowage Category**	A
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Quantity limitations**	On passenger aircraft/rail: 100 kg On cargo aircraft only: 200 kg
· **Hazardous substance:**	1 lbs, 0.454 kg
· **IMDG**	
· **Limited quantities (LQ)**	5 kg
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 g Maximum net quantity per outer packaging: 1000 g
· **IATA**	
· **Remarks:**	When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10. Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.
· **UN "Model Regulation":**	UN 2811 TOXIC SOLID, ORGANIC, N.O.S. (P,P'-DDE), 6.1, III, ENVIRONMENTALLY HAZARDOUS

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
No further relevant information available.
· **Sara**
· **Section 355 (extremely hazardous substances):** Substance is not listed.
· **Section 313 (Specific toxic chemical listings):** Substance is not listed.
· **TSCA (Toxic Substances Control Act):** Substance is not listed.
· **Hazardous Air Pollutants** Substance is not listed.
· **Proposition 65**
· **Chemicals known to cause cancer:** Substance is listed.
· **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
· **Chemicals known to cause reproductive toxicity for males:** Substance is listed.
· **Chemicals known to cause developmental toxicity:** Substance is listed.

· **Carcinogenic categories**
· **EPA (Environmental Protection Agency)** B2
· **TLV (Threshold Limit Value)** Substance is not listed.
· **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

16 Other information

All chemicals may pose unknown hazards and should be used with caution. This SDS applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. Cayman Chemical Company assumes no responsibility for incidental or consequential damages, including lost profits, arising from the use of

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these data. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Cayman Chemical Company assumes no responsibility for the completeness or accuracy of the information contained herein.

· **Department issuing SDS:** Environment protection department.
· **Contact:** -
· **Date of preparation / last revision** 01/15/2024
· **Abbreviations and acronyms:**
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Acute Toxicity - Oral 3: Acute toxicity – Category 3
Carcinogenicity 2: Carcinogenicity – Category 2
Specific Target Organ Toxicity - Repeated Exposure 1: Specific target organ toxicity (repeated exposure) – Category 1
Aquatic Acute 1: Hazardous to the aquatic environment - acute aquatic hazard – Category 1
Aquatic Chronic 1: Hazardous to the aquatic environment - long-term aquatic hazard – Category 1
· *** Data compared to the previous version altered.**

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acc. to OSHA HCS

Printing date 03/26/2019 Version Number 2 Reviewed on 03/26/2019

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1 Identification

· **Product identifier**

· **Trade name: p,p'-DDT**

· **Part number:** FRSP-180J
· **CAS Number:**
50-29-3
· **EC number:**
200-024-3
· **Index number:**
602-045-00-7
· **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA

· **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
· **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

· **Classification of the substance or mixture**



GHS06 Skull and crossbones

Acute Tox. 3 H301 Toxic if swallowed.
Acute Tox. 3 H311 Toxic in contact with skin.



GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.
STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.

· **Label elements**
· **GHS label elements** The substance is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**



GHS06



GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
DDT (common name not adopted by ISO)
· **Hazard statements**
Toxic if swallowed or in contact with skin.

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Suspected of causing cancer.
Causes damage to organs through prolonged or repeated exposure.

· **Precautionary statements**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Wear protective gloves/protective clothing/eye protection/face protection.
If swallowed: Immediately call a poison center/doctor.
Specific treatment (see on this label).
Rinse mouth.
If on skin: Wash with plenty of water.
IF exposed or concerned: Get medical advice/attention.
Call a poison center/doctor if you feel unwell.
Get medical advice/attention if you feel unwell.
Take off immediately all contaminated clothing and wash it before reuse.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Classification system:**
· **NFPA ratings (scale 0 - 4)**



Health = 2
Fire = 2
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = 2
Fire = 2
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Substances**
· **CAS No. Description**
50-29-3 DDT (common name not adopted by ISO)
· **Identification number(s)**
· **EC number:** 200-024-3
· **Index number:** 602-045-00-7

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4 First-aid measures

· **Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:** In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** Do not induce vomiting; immediately call for medical help.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
· **Advice for firefighters**
· **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures** Mount respiratory protective device.
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**
3 mg/m³
· **PAC-2:**
34 mg/m³
· **PAC-3:**
210 mg/m³

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7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Thorough dedusting.
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
· **Information about protection against explosions and fires:** Keep respiratory protective device available.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** No special requirements.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:** Keep receptacle tightly sealed.
· **Specific end use(s)** No further relevant information available.

*

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**	
50-29-3 DDT (common name not adopted by ISO)	
PEL	Long-term value: 1 mg/m³ Skin
REL	Long-term value: 0.5 mg/m³ See Pocket Guide App. A
TLV	Long-term value: 1 mg/m³

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
Avoid contact with the eyes and skin.
· **Breathing equipment:**
When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.
Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.
· **Protection of hands:**
Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.

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Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 4)

· **Material of gloves**
For normal use: nitrile rubber, 11-13 mil thickness
For direct contact with the chemical: butyl rubber, 12-15 mil thickness
The selection of the suitable gloves does not only depend on the material, but also on further marks of quality and varies from manufacturer to manufacturer.
· **Penetration time of glove material**
For normal use: nitrile rubber: 1 hour
For direct contact with the chemical: butyl rubber: >4 hours
· **Eye protection:**



Tightly sealed goggles

*
9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Solid
Color:	Not determined.
· **Odor:**	Characteristic
· **Odor threshold:**	Not determined.
· **pH-value:**	Not applicable.
· **Change in condition**	
Melting point/Melting range:	107-110 °C (224.6-230 °F)
Boiling point/Boiling range:	260 °C (500 °F)
· **Flash point:**	72-77 °C (161.6-170.6 °F)
· **Flammability (solid, gaseous):**	Product is not flammable.
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Not determined.
· **Danger of explosion:**	Product does not present an explosion hazard.
· **Explosion limits:**	
Lower:	Not determined.
Upper:	Not determined.
· **Vapor pressure at 20 °C (68 °F):**	0.0000016 hPa (0 mm Hg)
· **Density at 20 °C (68 °F):**	0.99 g/cm³ (8.26155 lbs/gal)
· **Relative density**	Not determined.
· **Vapor density**	Not applicable.
· **Evaporation rate**	Not applicable.
· **Solubility in / Miscibility with**	
Water at 20 °C (68 °F):	0.0000012 g/l
· **Partition coefficient (n-octanol/water):**	Not determined.

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Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 5)

· **Viscosity:**	
Dynamic:	Not applicable.
Kinematic:	Not applicable.
VOC content:	0.00 % 0.0 g/l / 0.00 lb/gal
Solids content:	100.0 %
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**

ATE (Acute Toxicity Estimate)		
Oral	LD50	87 mg/kg (rat)
Dermal	LD50	300 mg/kg (rabbit)

50-29-3 DDT (common name not adopted by ISO)		
Oral	LD50	87 mg/kg (rat)
Dermal	LD50	2,510 mg/kg (rat)
		300 mg/kg (rabbit)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
2A

· **NTP (National Toxicology Program)**
R

(Contd. on page 7)

Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 6)

· **OSHA-Ca (Occupational Safety & Health Administration)**

Substance is not listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 3 (Assessment by list): extremely hazardous for water
Do not allow product to reach ground water, water course or sewage system, even in small quantities.
Danger to drinking water if even extremely small quantities leak into the ground.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

*
14 Transport information

· **UN-Number**
· **DOT, IMDG, IATA** UN2811

· **UN proper shipping name**
· **DOT** Toxic solids, organic, n.o.s. (DDT (common name not adopted by ISO))
· **IMDG, IATA** TOXIC SOLID, ORGANIC, N.O.S. (DDT (common name not adopted by ISO))

· **Transport hazard class(es)**

· **DOT, IMDG, IATA**



· **Class** 6.1 Toxic substances

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Safety Data Sheet
acc. to OSHA HCS

Trade name: p,p'-DDT

(Contd. of page 7)

· **Label**	6.1
· **Packing group** · **DOT, IMDG, IATA**	III
· **Environmental hazards:**	Not applicable.
· **Special precautions for user** · **Danger code (Kemler):** · **EMS Number:** · **Stowage Category**	Warning: Toxic substances 60 F-A,S-A A
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.
· **Transport/Additional information:**	
· **DOT**	
· **Quantity limitations**	On passenger aircraft/rail: 100 kg On cargo aircraft only: 200 kg
· **Hazardous substance:**	1 lbs, 0.454 kg
· **IMDG**	
· **Limited quantities (LQ)**	5 kg
· **Excepted quantities (EQ)**	Code: E1 Maximum net quantity per inner packaging: 30 g Maximum net quantity per outer packaging: 1000 g
· **UN "Model Regulation":**	UN 2811 TOXIC SOLID, ORGANIC, N.O.S. (DDT (COMMON NAME NOT ADOPTED BY ISO)), 6.1, III, ENVIRONMENTALLY HAZARDOUS

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**
· **Sara**

· **Section 355 (extremely hazardous substances):**
Substance is not listed.

· **Section 313 (Specific toxic chemical listings):**
Substance is not listed.

· **TSCA (Toxic Substances Control Act):**
Substance is listed.

· **TSCA new (21st Century Act): (Substances not listed)**

50-29-3	DDT (common name not adopted by ISO)

· **Proposition 65**

· **Chemicals known to cause cancer:**
Substance is listed.

· **Chemicals known to cause reproductive toxicity for females:**
Substance is listed.

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Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 8)

· **Chemicals known to cause reproductive toxicity for males:**
Substance is listed.

· **Chemicals known to cause developmental toxicity:**
Substance is listed.

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**
B2

· **TLV (Threshold Limit Value established by ACGIH)**
A3

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**
Substance is listed.

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

*
16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· **Date of preparation / last revision** 03/26/2019 / 1

· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
Acute Tox. 3: Acute toxicity – Category 3
Carc. 2: Carcinogenicity – Category 2
STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1

· *** Data compared to the previous version altered.**

SAFETY DATA SHEET

Version 5.5
Revision Date 06/02/2016
Print Date 11/17/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : δ-BHC

Product Number : 48495
Brand : Supelco
Index-No. : 602-042-00-0

CAS-No. : 319-86-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H312 Harmful in contact with skin.
H351 Suspected of causing cancer.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of water.Call a POISON CENTER/doctor if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : δ-1,2,3,4,5,6-Hexachlorocyclohexane

Formula : C6H6Cl6
Molecular weight : 290.8 g/mol
CAS-No. : 319-86-8
EC-No. : 206-272-9
Index-No. : 602-042-00-0

Hazardous components

Component	Classification	Concentration
1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312, H351, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available

n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,000 mg/kg

Inhalation: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 2B - Group 2B: Possibly carcinogenic to humans (1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

NTP: Reasonably anticipated to be a human carcinogen (1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GV4550000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 2.83 mg/l - 96.0 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation other fish - 33 d
- 0.955 mg/l

Bioconcentration factor (BCF): 326

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-86-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-86-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-86-8	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
1α,2α,3α,4β,5α,6β)-1,2,3,4,5,6-Hexachlorocyclohexane	319-86-8	2015-08-14

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 06/02/2016 Print Date: 11/17/2016

SAFETY DATA SHEET

Version 6.9
Revision Date 03/04/2024
Print Date 07/13/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Dibenz[*a*,*h*]anthracene

Product Number : 48574
Brand : Supelco
Index-No. : 601-041-00-2
CAS-No. : 53-70-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 1B), H350
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Danger

Hazard Statements

H350	May cause cancer.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 1,2:5,6-Dibenzanthracene

Formula : $C_{22}H_{14}$
Molecular weight : 278.35 g/mol
CAS-No. : 53-70-3
EC-No. : 200-181-8
Index-No. : 601-041-00-2

Component	Classification	Concentration
Dibenz[a,h]anthracene		
	Carc. 1B; Aquatic Acute 1; Aquatic Chronic 1; H350, H400, H410 Concentration limits: >= 0.01 %: Carc. 1B, H350; M-Factor - Aquatic Acute: 1 - Aquatic Chronic: 100	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
Dibenz[a,h]anthracene	53-70-3	PEL	0.2 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Dibenz[a,h]anthracene	53-70-3	1-Hydroxypyrene	2.5 µg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		3-hydroxybenzo(a)pyrene		Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This

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recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 262 - 265 °C (504 - 509 °F) - lit.
f)	Initial boiling point and boiling range	524 °C 975 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	No data available

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o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
strong oxidising agents

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

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Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
Presumed to have carcinogenic potential for humans

IARC: 2A - Group 2A: Probably carcinogenic to humans (Dibenz[a,h]anthracene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Dibenz[a,h]anthracene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: HN2625000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Lungs -

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.496 mg/l - 48 h Remarks: (ECOTOX Database)
Toxicity to algae	NOEC - Raphidocelis subcapitata (freshwater green alga) - 0.00033 mg/l - 72 h Remarks: (ECOTOX Database)

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

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12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenz[a,h]anthracene)
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Dibenz[a,h]anthracene)
Marine pollutant : yes
Marine pollutant : no

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenz[a,h]anthracene)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

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SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Dibenz[a,h]anthracene	53-70-3	1993-02-16

SARA 311/312 Hazards
Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dibenz[a,h]anthracene	53-70-3	1993-02-16

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dibenz[a,h]anthracene	53-70-3	1993-02-16

California Prop. 65 Components

, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.Dibenz[a,h]anthracene	CAS-No. 53-70-3	Revision Date 2007-09-28

SECTION 16: Other information

Further information
The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.
Version: 6.9 Revision Date: 03/04/2024 Print Date: 07/13/2024

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SAFETY DATA SHEET

Version 3.7
Revision Date 11/25/2014
Print Date 01/29/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Dibenzofuran

Product Number : 236373
Brand : Aldrich

CAS-No. : 132-64-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P391 Collect spillage.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Diphenylene oxide

Formula : $C_{12}H_8O$
Molecular weight : 168.19 g/mol
CAS-No. : 132-64-9
EC-No. : 205-071-3

Hazardous components

Component	Classification	Concentration
Dibenzofuran		
	Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information

No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an

industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: white, beige
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 80 - 82 °C (176 - 180 °F) - lit.
f)	Initial boiling point and boiling range	154 - 155 °C (309 - 311 °F) at 27 hPa (20 mmHg) - lit.
g)	Flash point	130.0 °C (266.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.77
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
The preceding data, or interpretation of data, was determined using Quantitative Structure Activity Relationship (QSAR) modeling.

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: HP4430000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	NOEC - Cyprinodon variegatus (sheepshead minnow) - 1 mg/l - 96.0 h
	LC50 - Pimephales promelas (fathead minnow) - 1.05 mg/l - 96.0 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)
Reportable Quantity (RQ): 100 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Dibenzofuran)
Marine pollutant:yes

IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Dibenzofuran)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date

Dibenzofuran	132-64-9	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dibenzofuran	132-64-9	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H302	Harmful if swallowed.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.7 Revision Date: 11/25/2014 Print Date: 01/29/2016

SAFETY DATA SHEET

Version 3.11
Revision Date 03/03/2015
Print Date 05/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Dibutyl phthalate

Product Number : 152439
Brand : Aldrich
Index-No. : 607-318-00-4

CAS-No. : 84-74-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Reproductive toxicity (Category 1B), H360
Acute aquatic toxicity (Category 1), H400

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H360 May damage fertility or the unborn child.
H400 Very toxic to aquatic life.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P273 Avoid release to the environment.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P391 Collect spillage.
P405 Store locked up.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	n-Butyl phthalate Phthalic acid dibutyl ester DBP
Formula	:	$C_{16}H_{22}O_4$
Molecular weight	:	278.34 g/mol
CAS-No.	:	84-74-2
EC-No.	:	201-557-4
Index-No.	:	607-318-00-4
Registration number	:	01-2119493042-44-XXXX

Hazardous components

Component	Classification	Concentration
Dibutyl phthalate Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Repr. 1B; Aquatic Acute 1; H360, H400	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Dibutyl phthalate	84-74-2	TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation Eye irritation Testicular damage		
		TWA	5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Eye irritation Testicular damage		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 120 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -35 °C (-31 °F) - lit.
f)	Initial boiling point and boiling range	340 °C (644 °F) - lit.
g)	Flash point	171.0 °C (339.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	Lower explosion limit: 0.47 %(V)

	flammability or explosive limits	
k)	Vapour pressure	1.3 hPa (1.0 mmHg) at 147.0 °C (296.6 °F)
l)	Vapour density	No data available
m)	Relative density	1.043 g/cm3 at 25 °C (77 °F)
n)	Water solubility	0.0114 g/l at 25 °C (77 °F) - OECD Test Guideline 105 - slightly soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	402.0 °C (755.6 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	18.8 mm2/s at 20 °C (68 °F) -
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Nitrates, Bases, acids, Chlorine

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 8,000 mg/kg

LC50 Inhalation - Rat - 4,250 mg/m3

LD50 Dermal - Rabbit - > 20,860 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation
(OECD Test Guideline 404)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitisation
Maximisation Test (GPMT) - Guinea pig
Result: Does not cause skin sensitisation.
(OECD Test Guideline 406)

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Presumed human reproductive toxicant

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: TI0875000

Nausea, Dizziness, Headache, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 0.85 mg/l - 96.0 h
	NOEC - Pimephales promelas (fathead minnow) - 0.32 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 3.7 mg/l - 48 h

12.2 Persistence and degradability

Biodegradability	Result: 81 % - Readily biodegradable (C.4-C of the COUNCIL REGULATION (EC) No 440/2008)

12.3 Bioaccumulative potential

Bioaccumulation	Pimephales promelas (fathead minnow) - 11 d - 0.0348 mg/l Bioconcentration factor (BCF): 2,165 Remarks: Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Dibutyl phthalate)
Reportable Quantity (RQ): 10 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Dibutyl phthalate)
Marine pollutant:yes

IATA

UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Dibutyl phthalate)

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Dibutyl phthalate	84-74-2	2007-07-01

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dibutyl phthalate	84-74-2	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dibutyl phthalate	84-74-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dibutyl phthalate	84-74-2	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.	84-74-2	2008-06-17
Dibutyl phthalate		

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
H360	May damage fertility or the unborn child.
H400	Very toxic to aquatic life.
Repr.	Reproductive toxicity

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.11 Revision Date: 03/03/2015 Print Date: 05/01/2016

SAFETY DATA SHEET

Halocarbon R-12 (Dichlorodifluoromethane)

Section 1. Identification

GHS product identifier : Halocarbon R-12 (Dichlorodifluoromethane)

Chemical name : dichlorodifluoromethane

Other means of identification : ASPEN R-12, Methane, dichlorodifluoro-; Refrigerant 12; Propellant 12; Halon 122; Genetron 12; Freon 12; Fluorocarbon 12; Difluorodichloromethane; DICHLORODIFLUOROMETHANE (FC 12); CFC-12

Product use : Synthetic/Analytical chemistry.

Synonym : ASPEN R-12, Methane, dichlorodifluoro-; Refrigerant 12; Propellant 12; Halon 122; Genetron 12; Freon 12; Fluorocarbon 12; Difluorodichloromethane; DICHLORODIFLUOROMETHANE (FC 12); CFC-12

SDS # : 001018

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Liquefied gas
HAZARDOUS TO THE OZONE LAYER - Category 1

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May cause frostbite.
May displace oxygen and cause rapid suffocation.
Harms public health and the environment by destroying ozone in the upper atmosphere.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Refer to manufacturer/supplier for information on recovery/recycling.

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Section 2. Hazards identification

Hazards not otherwise classified : Liquid can cause burns similar to frostbite.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : dichlorodifluoromethane

Other means of identification : ASPEN R-12, Methane, dichlorodifluoro-; Refrigerant 12; Propellant 12; Halon 122; Genetron 12; Freon 12; Fluorocarbon 12; Difluorodichloromethane; DICHLORODIFLUOROMETHANE (FC 12); CFC-12

CAS number/other identifiers

CAS number : 75-71-8

Product code : 001018

Ingredient name	%	CAS number
Methane, dichlorodifluoro-	100	75-71-8

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. In case of contact with liquid, warm frozen tissues slowly with lukewarm water and get medical attention. Do not rub affected area. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if adverse health effects persist or are severe. Ingestion of liquid can cause burns similar to frostbite. If frostbite occurs, get medical attention. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. As this product rapidly becomes a gas when released, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Liquid can cause burns similar to frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

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Section 4. First aid measures

Skin contact : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : Ingestion of liquid can cause burns similar to frostbite.

Over-exposure signs/symptoms

Eye contact : Adverse symptoms may include the following:
frostbite

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
frostbite

Ingestion : Adverse symptoms may include the following:
frostbite

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
carbonyl halides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. For incidents involving large quantities, thermally insulated undergarments and thick textile or leather gloves should be worn.

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Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). May be harmful to the environment if released in large quantities.

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Do not get in eyes or on skin or clothing. Avoid breathing gas. Avoid release to the environment. Refer to special instructions/safety data sheet. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

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Section 8. Exposure controls/personal protection

Ingredient name	Exposure limits
Methane, dichlorodifluoro-	**ACGIH TLV (United States, 3/2012).** TWA: 4950 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **NIOSH REL (United States, 1/2013).** TWA: 4950 mg/m³ 10 hours. TWA: 1000 ppm 10 hours. **OSHA PEL (United States, 6/2010).** TWA: 4950 mg/m³ 8 hours. TWA: 1000 ppm 8 hours. **OSHA PEL 1989 (United States, 3/1989).** TWA: 4950 mg/m³ 8 hours. TWA: 1000 ppm 8 hours.

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. If contact with the liquid is possible, insulated gloves suitable for low temperatures should be worn. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

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Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Liquefied gas]

Color : Colorless.

Molecular weight : 120.91 g/mole

Molecular formula : C-Cl2-F2

Boiling/condensation point : -29.8°C (-21.6°F)

Melting/freezing point : -158°C (-252.4°F)

Critical temperature : 111.85°C (233.3°F)

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Flash point : [Product does not sustain combustion.]

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : 84.9 (psia)

Vapor density : 4.2 (Air = 1)

Specific Volume (ft^3/lb) : 3.1746

Gas Density (lb/ft^3) : 0.315

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.3 g/l

Partition coefficient: n-octanol/water : 2.16

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

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Section 10. Stability and reactivity

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Liquid can cause burns similar to frostbite.

Inhalation : Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Skin contact : Dermal contact with rapidly evaporating liquid could result in freezing of the tissues or frostbite.

Ingestion : Ingestion of liquid can cause burns similar to frostbite.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : Adverse symptoms may include the following:
frostbite

Inhalation : No specific data.

Skin contact : Adverse symptoms may include the following:
frostbite

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Section 11. Toxicological information

Ingestion : Adverse symptoms may include the following:
frostbite

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Methane, dichlorodifluoro-	2.16	6.17	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

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Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

United States - RCRA Toxic hazardous waste "U" List

Ingredient	CAS #	Status	Reference number
Dichlorodifluoromethane; Methane, dichlorodifluoro-	75-71-8	Listed	U075

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1028	UN1028	UN1028	UN1028	UN1028
UN proper shipping name	DICHLORODIFLUOROMETHANE OR REFRIGERANT GAS R 12	DICHLORODIFLUOROMETHANE; OR REFRIGERANT GAS R 12	DICHLORODIFLUOROMETHANE OR REFRIGERANT GAS R 12	DICHLORODIFLUOROMETHANE (REFRIGERANT GAS R 12)	DICHLORODIFLUOROMETHANE
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Reportable quantity** 5000 lbs / 2270 kg Package sizes shipped in quantities less than the product reportable quantity are not subject to the RQ (reportable quantity) transportation requirements. **Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 75 kg **Cargo aircraft** Quantity limitation: 150 kg **Special provisions** T50	**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	**Passenger and Cargo Aircraft** Quantity limitation: 75 kg **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

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Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

TSCA 12(b) annual export notification: dichlorodifluoromethane

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Methane, dichlorodifluoro-	100	No.	Yes.	No.	No.	No.

SARA 313

	Product name	CAS number	%
Form R - Reporting requirements	dichlorodifluoromethane	75-71-8	100
Supplier notification	dichlorodifluoromethane	75-71-8	100

SARA 313 notifications must not be detached from the SDS and any copying and redistribution of the SDS shall include copying and redistribution of the notice attached to copies of the SDS subsequently redistributed.

State regulations

Massachusetts : This material is listed.

New York : This material is listed.

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Section 15. Regulatory information

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: This material is listed or exempted.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

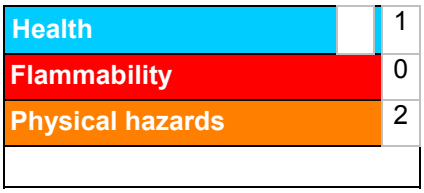
Canada

WHMIS (Canada) : Class A: Compressed gas.
CEPA Toxic substances: This material is listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Section 16. Other information

Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 5/21/2015.

Date of issue/Date of revision : 5/21/2015.

Date of previous issue : 5/21/2015.

Version : 2

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Other special considerations : WARNING: Contains (Dichlorodifluoromethane), a substance which harms the public health and environment by destroying ozone in the upper atmosphere.

Notice to reader

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Section 16. Other information

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Version 5.5
Revision Date 02/28/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Dieldrin

Product Number : 291218
Brand : Aldrich
Index-No. : 602-049-00-9

CAS-No. : 60-57-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Dermal (Category 3), H311
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H300 Fatal if swallowed.
H311 Toxic in contact with skin.
H351 Suspected of causing cancer.
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.

P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,2,3,4,10,10-Hexachloro-1,4,4a,5,6,7,8,8a-octahydro-6,7-epoxy-1,4:5,8-dimethanonaphthalene

Formula : $C_{12}H_8Cl_6O$

Molecular weight : 380.91 g/mol

CAS-No. : 60-57-1

EC-No. : 200-484-5

Index-No. : 602-049-00-9

Hazardous components

Component	Classification	Concentration
Dieldrin		
	Acute Tox. 2; Acute Tox. 3; Carc. 2; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H300, H311, H351, H372, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Dieldrin	60-57-1	TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Liver damage Reproductive effects Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

		TWA	0.250000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A Potential for dermal absorption		
		TWA	0.250000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available

d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 143 - 144 °C (289 - 291 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Mouse - 38.0 mg/kg

LD50 Oral - Dog - 65.0 mg/kg

LD50 Oral - Monkey - 3.0 mg/kg

LD50 Oral - Rabbit - 45.0 mg/kg

LD50 Oral - Pig - 38.0 mg/kg

LD50 Oral - Guinea pig - 49.0 mg/kg

LD50 Oral - Hamster - 60.0 mg/kg

LD50 Oral - Pigeon - 23.7 mg/kg

LD50 Oral - Chicken - 20.0 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Miosis (pupilliary constriction). Behavioral:Excitement. Behavioral:Food intake (animal).

LD50 Oral - Quail - 10.8 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity). Behavioral:Irritability.

LD50 Oral - Duck - 381.0 mg/kg

LD50 Oral - Mammal - 94.0 mg/kg
Remarks: Peripheral Nerve and Sensation:Flaccid paralysis without anesthesia (usually neuromuscular blockage). Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold.

LD50 Oral - Bird (wild) - 13.3 mg/kg

LDLO Oral - Rat - 30.0 mg/kg
Remarks: Liver:Other changes.

LDLO Oral - Human - male - 65.0 mg/kg

LDLO Oral - Cat - 500 mg/kg
Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Fatty liver degeneration. Kidney, Ureter, Bladder:Other changes.

TDLo Oral - Rat - 140 mg/kg
Remarks: Liver:Other changes. Blood:Other changes. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Other esterases.

TDLo Oral - Rat - 109 mg/kg
Remarks: Liver:Changes in liver weight.

TDLo Oral - Rat - 88 mg/kg
Remarks: Behavioral:Food intake (animal). Nutritional and Gross Metabolic:Weight loss or decreased weight gain. Biochemical:Enzyme inhibition, induction, or change in blood or tissue levels: Phosphatases.

Inhalation: No data available

LD50 Dermal - Rabbit - 250.0 mg/kg

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Dieldrin)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: IO1750000

Discomfort, Headache, Nausea, Vomiting, Dizziness, Tremors, tonic convulsions, clonic spasms, Coma., respiratory failure, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Blood - Irregularities - Based on Human Evidence
Blood - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Carassius auratus (goldfish) - 1.6 µg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 79.5 µg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Dieldrin)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Dieldrin)
Marine pollutant:yes

IATA
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic, n.o.s. (Dieldrin)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Dieldrin	60-57-1	1993-04-24

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Dieldrin	CAS-No. 60-57-1	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H300	Fatal if swallowed.
H311	Toxic in contact with skin.
H351	Suspected of causing cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 02/28/2015 Print Date: 02/09/2016

SAFETY DATA SHEET

1. Identification

Product identifier **DIESEL FUELS**

Other means of identification

SDS number 102-GHS

Synonyms Diesel Fuels All Grades, Diesel Fuel No.2, Fuel Oil No.2, High Sulfur Diesel Fuel, Low Sulfur Diesel Fuel, Ultra Low Sulfur Diesel Fuel, CARB (California Air Resource Board) Diesel Fuel, Off-Road Diesel Fuel, Dyed Diesel Fuel, X Grade Diesel Fuel, X-1 Diesel Fuel, R5 ULSD, B5 ULS D See section 16 for complete information.

Recommended use Motor Fuel
Refinery feedstock.

Recommended restrictions None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer/Supplier Valero Marketing & Supply Company and Affiliates
One Valero Way
San Antonio, TX 78269-6000

General Assistance 210-345-4593

E-Mail CorpHSE@valero.com

Contact Person Industrial Hygienist

Emergency Telephone 24 Hour Emergency 866-565-5220
1-800-424-9300 (CHEMTREC USA)

2. Hazard(s) identification

Physical hazards	Flammable liquids	Category 3
Health hazards	Acute toxicity, inhalation	Category 4
	Skin corrosion/irritation	Category 2
	Carcinogenicity	Category 2
	Reproductive toxicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 2
	Aspiration hazard	Category 1
Environmental hazards	Hazardous to the aquatic environment, long-term hazard	Category 2

OSHA defined hazards Not classified.

Label elements



Signal word Danger

Hazard statement Flammable liquid and vapor. Harmful if inhaled. Causes skin irritation. Suspected of causing cancer. Suspected of damaging fertility or the unborn child. May cause damage to organs (blood, thymus, liver) through prolonged or repeated exposure. May be fatal if swallowed and enters airways.

Precautionary statement

Prevention Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Keep away from heat/sparks/open flames/hot surfaces. - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Do not breathe mist/vapors/spray. Wash thoroughly after handling. Wear protective gloves/protective clothing/eye protection/face protection. Use only outdoors or in a well-ventilated area.

Response	If skin irritation occurs: Get medical advice/attention. If inhaled: Remove person to fresh air and keep comfortable for breathing. If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower. If exposed or concerned: Get medical advice/attention. If swallowed: Immediately call a poison center/doctor. Take off contaminated clothing and wash before reuse. In case of fire: Use foam, carbon dioxide, dry powder or water fog for extinction.
Storage	Store locked up. Store in a well-ventilated place. Keep cool.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.
Hazard(s) not otherwise classified (HNOC)	None known.

3. Composition/information on ingredients

Mixtures

Chemical name	CAS number	%
Fuels, diesel, no. 2	68476-34-6	85 - 100
Biodiesel - Fatty acid methyl esters	67762-38-3	0 - 10
Fuels, diesel, C9-18-alkane branched and linear	1159170-26-9	0 - 5
n-Nonane	111-84-2	1 - 3
Octane (All isomers)	111-65-9	1 - 2
Hexane (Other isomers)	96-14-0	0 - 1
Naphthalene	91-20-3	0 - 1
n-Heptane	142-82-5	0 - 1
n-Hexane	110-54-3	0 - 1

4. First-aid measures

Inhalation	Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.
Skin contact	Remove contaminated clothing and shoes. Wash off immediately with soap and plenty of water. Get medical attention if irritation develops or persists. Wash clothing separately before reuse. Destroy or thoroughly clean contaminated shoes. If high pressure injection under the skin occurs, always seek medical attention.
Eye contact	Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention.
Ingestion	Rinse mouth thoroughly. Do not induce vomiting without advice from poison control center. Do not give mouth-to-mouth resuscitation. If vomiting occurs, keep head low so that stomach content does not get into the lungs. Never give anything by mouth to a victim who is unconscious or is having convulsions. Get medical attention immediately.
Most important symptoms/effects, acute and delayed	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash. The toxicological properties of this product have not been thoroughly investigated. Use appropriate precautions. Hydrogen sulfide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere.
Indication of immediate medical attention and special treatment needed	In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed. The toxicological properties of this material have not been fully investigated.
General information	If exposed or concerned: get medical attention/advice. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves. Show this safety data sheet to the doctor in attendance. Wash contaminated clothing before re-use.

5. Fire-fighting measures

Suitable extinguishing media	Water spray. Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media	Do not use a solid water stream as it may scatter and spread fire.
Specific hazards arising from the chemical	The product is flammable, and heating may generate vapors which may form explosive vapor/air mixtures. Thermal decomposition or combustion may liberate toxic gases or fumes.
Special protective equipment and precautions for firefighters	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask.
Fire-fighting equipment/instructions	Wear full protective clothing, including helmet, self-contained positive pressure or pressure demand breathing apparatus, protective clothing and face mask. Withdraw immediately in case of rising sound from venting safety devices or any discoloration of tanks due to fire. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Move containers from fire area if you can do it without risk. In the event of fire, cool tanks with water spray. Cool containers exposed to flames with water until well after the fire is out. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn. Water runoff can cause environmental damage. Use compatible foam to minimize vapor generation as needed.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures	Keep unnecessary personnel away. Local authorities should be advised if significant spills cannot be contained. Keep upwind. Keep out of low areas. Ventilate closed spaces before entering. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. See Section 8 of the SDS for Personal Protective Equipment.
Methods and materials for containment and cleaning up	Eliminate all ignition sources (no smoking, flares, sparks, or flames in immediate area). Local authorities should be advised if significant spillages cannot be contained. Stop leak if you can do so without risk. This material is a water pollutant and should be prevented from contaminating soil or from entering sewage and drainage systems and bodies of water. Dike the spilled material, where this is possible. Prevent entry into waterways, sewers, basements or confined areas. Use non-sparking tools and explosion-proof equipment. Small Spills: Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Clean surface thoroughly to remove residual contamination. This material and its container must be disposed of as hazardous waste. Large Spills: Use a non-combustible material like vermiculite, sand or earth to soak up the product and place into a container for later disposal. Prevent product from entering drains. Do not allow material to contaminate ground water system. Should not be released into the environment. Clean up in accordance with all applicable regulations.
Environmental precautions	If facility or operation has an "oil or hazardous substance contingency plan", activate its procedures. Stay upwind and away from spill. Wear appropriate protective equipment including respiratory protection as conditions warrant. Do not enter or stay in area unless monitoring indicates that it is safe to do so. Isolate hazard area and restrict entry to emergency crew. Flammable. Review Firefighting Measures, Section 5, before proceeding with clean up. Keep all sources of ignition (flames, smoking, flares, etc.) and hot surfaces away from release. Contain spill in smallest possible area. Recover as much product as possible (e.g. by vacuuming). Stop leak if it can be done without risk. Use water spray to disperse vapors. Use compatible foam to minimize vapor generation as needed. Spilled material may be absorbed by an appropriate absorbent, and then handled in accordance with environmental regulations. Prevent spilled material from entering sewers, storm drains, other unauthorized treatment or drainage systems and natural waterways. Contact fire authorities and appropriate federal, state and local agencies. If spill of any amount is made into or upon navigable waters, the contiguous zone, or adjoining shorelines, contact the National Response Center at 1-800-424-8802. For highway or railways spills, contact Chemtrec at 1-800-424-9300.

7. Handling and storage

Precautions for safe handling	Eliminate sources of ignition. Avoid spark promoters. Ground/bond container and equipment. These alone may be insufficient to remove static electricity. Wear personal protective equipment. Avoid breathing mist/vapors/spray. Avoid contact with eyes, skin, and clothing. Do not taste or swallow. Avoid prolonged exposure. Use only with adequate ventilation. Wash thoroughly after handling. The product is combustible, and heating may generate vapors which may form explosive vapor/air mixtures. DO NOT handle, store or open near an open flame, sources of heat or sources of ignition. Protect material from direct sunlight. Take precautionary measures against static discharges. All equipment used when handling the product must be grounded. Use non-sparking tools and explosion-proof equipment. When using, do not eat, drink or smoke. Avoid release to the environment.

Conditions for safe storage, including any incompatibilities	Flammable liquid storage. Do not handle or store near an open flame, heat or other sources of ignition. This material can accumulate static charge which may cause spark and become an ignition source. The pressure in sealed containers can increase under the influence of heat. Keep container tightly closed in a cool, well-ventilated place. Keep away from food, drink and animal feedingstuffs. Keep out of the reach of children.

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Table Z-1 Limits for Air Contaminants (29 CFR 1910.1000)

Components	Type	Value
Naphthalene (CAS 91-20-3)	PEL	50 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	PEL	2000 mg/m3
		500 ppm
n-Hexane (CAS 110-54-3)	PEL	1800 mg/m3
		500 ppm
Octane (All isomers) (CAS 111-65-9)	PEL	2350 mg/m3
		500 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value	Form
Fuels, diesel, no. 2 (CAS 68476-34-6)	TWA	100 mg/m3	Inhalable fraction and vapor.
Hexane (Other isomers) (CAS 96-14-0)	STEL	1000 ppm	
	TWA	500 ppm	
Naphthalene (CAS 91-20-3)	STEL	15 ppm	
	TWA	10 ppm	
n-Heptane (CAS 142-82-5)	STEL	500 ppm	
	TWA	400 ppm	
n-Hexane (CAS 110-54-3)	TWA	50 ppm	
n-Nonane (CAS 111-84-2)	TWA	200 ppm	
Octane (All isomers) (CAS 111-65-9)	TWA	300 ppm	

US. NIOSH: Pocket Guide to Chemical Hazards

Components	Type	Value
Hexane (Other isomers) (CAS 96-14-0)	Ceiling	1800 mg/m3
		510 ppm
	TWA	350 mg/m3
		100 ppm
Naphthalene (CAS 91-20-3)	STEL	75 mg/m3
		15 ppm
	TWA	50 mg/m3
		10 ppm
n-Heptane (CAS 142-82-5)	Ceiling	1800 mg/m3
		440 ppm
	TWA	350 mg/m3
		85 ppm
n-Hexane (CAS 110-54-3)	TWA	180 mg/m3
		50 ppm
n-Nonane (CAS 111-84-2)	TWA	1050 mg/m3
		200 ppm
Octane (All isomers) (CAS 111-65-9)	Ceiling	1800 mg/m3
		385 ppm
	TWA	350 mg/m3
		75 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
n-Hexane (CAS 110-54-3)	0.4 mg/l	2,5-Hexanedion, without hydrolysis	Urine	*
	0.4 mg/l	2,5-Hexanedi - on, without hydrolysis		*

* - For sampling details, please see the source document.

Exposure guidelines

US - California OELs: Skin designation

n-Hexane (CAS 110-54-3) Can be absorbed through the skin.

US ACGIH Threshold Limit Values: Skin designation

Fuels, diesel, no. 2 (CAS 68476-34-6) Can be absorbed through the skin.
Naphthalene (CAS 91-20-3) Can be absorbed through the skin.
n-Hexane (CAS 110-54-3) Can be absorbed through the skin.

Appropriate engineering controls Provide adequate general and local exhaust ventilation. Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits. Use explosion-proof equipment.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses. If splash potential exists, wear full face shield or chemical goggles.

Skin protection

Hand protection Wear chemical-resistant, impervious gloves. Suitable gloves can be recommended by the glove supplier. Be aware that the liquid may penetrate the gloves. Frequent change is advisable.

Other Full body suit and boots are recommended when handling large volumes or in emergency situations. Flame retardant protective clothing is recommended.

Respiratory protection Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. If workplace exposure limits for product or components are exceeded, NIOSH approved equipment should be worn. Proper respirator selection should be determined by adequately trained personnel, based on the contaminants, the degree of potential exposure and published respiratory protection factors. This equipment should be available for nonroutine and emergency use.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations Consult supervisor for special handling instructions. Avoid contact with eyes. Avoid contact with skin. Keep away from food and drink. Wash hands before breaks and immediately after handling the product. Provide eyewash station and safety shower. Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Appearance Liquid (may be dyed red).

Physical state Liquid.

Form Liquid.

Color Clear. Straw.

Odor Kerosene (strong).

Odor threshold Not available.

pH Not available.

Melting point/freezing point -60.07 °F (-51.15 °C) Estimated

Initial boiling point and boiling range 325 - 700 °F (162.78 - 371.11 °C)

Flash point > 100.0 °F (> 37.8 °C) Closed Cup

Evaporation rate 0.02

Flammability (solid, gas) Not available.

Upper/lower flammability or explosive limits

Flammability limit - lower (%)	0.4 %
Flammability limit - upper (%)	8 %
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	< 1 mm Hg (20°C)
Vapor density	3 (Air = 1)
Relative density	0.82 - 0.87
Relative density temperature	60 °F (15.56 °C)
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	494.96 °F (257.2 °C)
Decomposition temperature	Not available.
Viscosity	2 - 4.5 mm²/s

10. Stability and reactivity

Reactivity	Stable at normal conditions.
Chemical stability	Stable under normal temperature conditions and recommended use.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Heat, flames and sparks. Ignition sources. Contact with incompatible materials. Do not pressurize, cut, weld, braze, solder, drill, grind or expose empty containers to heat, flame, sparks, static electricity, or other sources of ignition; they may explode and cause injury or death.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Ingestion	May be fatal if swallowed and enters airways.
Inhalation	Harmful if inhaled. In high concentrations, vapors and spray mists are narcotic and may cause headache, fatigue, dizziness and nausea.
Skin contact	Causes skin irritation.
Eye contact	May cause eye irritation.
Symptoms related to the physical, chemical and toxicological characteristics	Irritation of nose and throat. Irritation of eyes and mucous membranes. Skin irritation. Unconsciousness. Corneal damage. Narcosis. Decrease in motor functions. Behavioral changes. Edema. Liver enlargement. Jaundice. Conjunctivitis. Proteinuria. Defatting of the skin. Rash. The toxicological properties of this product have not been thoroughly investigated. Use appropriate precautions.

Information on toxicological effects

Acute toxicity	Harmful if inhaled. Harmful: may cause lung damage if swallowed. The toxicological properties of this material have not been fully investigated.

Components	**Species**	**Test Results**
Fuels, diesel, no. 2 (CAS 68476-34-6)		
Acute		
Inhalation		
LC50	Rat	4.1 mg/l, 4 hours

Components	Species	Test Results
Naphthalene (CAS 91-20-3)		
Acute		
Dermal		
LD50	Rabbit	> 2 g/kg
Oral		
LD50	Rat	490 mg/kg
n-Heptane (CAS 142-82-5)		
Acute		
Inhalation		
LC50	Rat	103 mg/l, 4 Hours
n-Hexane (CAS 110-54-3)		
Acute		
Oral		
LD50	Rat	28710 mg/kg
n-Nonane (CAS 111-84-2)		
Acute		
Inhalation		
LC50	Rat	3200 mg/l, 4 Hours
Octane (All isomers) (CAS 111-65-9)		
Acute		
Inhalation		
LC50	Rat	118 mg/l, 4 Hours

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Based on available data, the classification criteria are not met.

Respiratory or skin sensitization

Respiratory sensitization Based on available data, the classification criteria are not met.

Skin sensitization Based on available data, the classification criteria are not met.

Germ cell mutagenicity Based on available data, the classification criteria are not met.

Carcinogenicity Suspected of causing cancer.
International Agency for Research on Cancer (IARC): Whole diesel engine exhaust – IARC Group 1. Exposure may cause lung cancer and also noted a positive association with an increased risk of bladder cancer.
Diesel exhaust has been reported to be an occupational hazard due to NIOSH-reported potential carcinogenic properties.

IARC Monographs. Overall Evaluation of Carcinogenicity

Fuels, diesel, no. 2 (CAS 68476-34-6)	3 Not classifiable as to carcinogenicity to humans.
Naphthalene (CAS 91-20-3)	2B Possibly carcinogenic to humans.

NTP Report on Carcinogens

Naphthalene (CAS 91-20-3)	Reasonably Anticipated to be a Human Carcinogen.

Reproductive toxicity Suspected of damaging fertility or the unborn child.
Napthalene interferes with embryo development in experimental animals at dose levels that cause maternal toxicity. In humans, excessive exposure to this agent may cause hemolytic anemia in the mother and fetus.

Specific target organ toxicity - single exposure Based on available data, the classification criteria are not met.

Specific target organ toxicity - repeated exposure May cause damage to the following organs through prolonged or repeated exposure: Blood. Liver. Thymus.

Aspiration hazard May be fatal if swallowed and enters airways.

Chronic effects Contains organic solvents which in case of overexposure may depress the central nervous system causing dizziness and intoxication. Repeated exposure to naphthalene may cause cataracts, allergic skin rashes, destruction of red blood cells, and anemia, jaundice, kidney and liver damage. Danger of serious damage to health by prolonged exposure. Prolonged or repeated overexposure may cause central nervous system, kidney, liver, and lung damage.

Further information Symptoms may be delayed. Hydrogen sulfide, a highly toxic gas, may be present. Signs and symptoms of overexposure to hydrogen sulfide include respiratory and eye irritation, dizziness, nausea, coughing, a sensation of dryness and pain in the nose, and loss of consciousness. Odor does not provide a reliable indicator of the presence of hazardous levels in the atmosphere. Toxicological properties of this material have not been fully investigated.

12. Ecological information

Ecotoxicity Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Components		Species	Test Results
Fuels, diesel, no. 2 (CAS 68476-34-6)			
Aquatic			
Acute			
Crustacea	EL50	Daphnia magna	68 mg/l, 48 hours
Fish	LL50	Oncorhynchus mykiss	65 mg/l, 96 hours
Naphthalene (CAS 91-20-3)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	1.09 - 3.4 mg/l, 48 hours
Fish	LC50	Pink salmon (Oncorhynchus gorbuscha)	0.95 - 1.62 mg/l, 96 hours
n-Heptane (CAS 142-82-5)			
Aquatic			
Fish	LC50	Western mosquitofish (Gambusia affinis)	4924 mg/l, 96 hours
n-Hexane (CAS 110-54-3)			
Aquatic			
Fish	LC50	Fathead minnow (Pimephales promelas)	2.101 - 2.981 mg/l, 96 hours

Persistence and degradability Not available.

Bioaccumulative potential Not available.

Partition coefficient n-octanol / water (log Kow)

Hexane (Other isomers) (CAS 96-14-0)	3.6
Octane (All isomers) (CAS 111-65-9)	5.18
n-Heptane (CAS 142-82-5)	4.66
n-Hexane (CAS 110-54-3)	3.9
n-Nonane (CAS 111-84-2)	5.46

Mobility in soil Not available.

Other adverse effects Not available.

13. Disposal considerations

Disposal instructions Dispose in accordance with all applicable regulations. This material and its container must be disposed of as hazardous waste. Dispose of this material and its container to hazardous or special waste collection point. Incinerate the material under controlled conditions in an approved incinerator. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container.

Hazardous waste code D001: Waste Flammable material with a flash point <140 °F

US RCRA Hazardous Waste U List: Reference

Naphthalene (CAS 91-20-3)	U165

Waste from residues / unused products Dispose of in accordance with local regulations.

Contaminated packaging Offer rinsed packaging material to local recycling facilities.

14. Transport information

DOT

UN number UN1202

UN proper shipping name Diesel fuel

Transport hazard class(es)

Class Combustible Liquid

Subsidiary risk -

Packing group III

Environmental hazards

Marine pollutant	Yes
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	144, B1, IB3, T2, TP1
Packaging exceptions	150
Packaging non bulk	203
Packaging bulk	242

IATA

UN number	UN1202
UN proper shipping name	Diesel fuel
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	III
Environmental hazards	Yes
ERG Code	3L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

IMDG

UN number	UN1202
UN proper shipping name	DIESEL FUEL
Transport hazard class(es)	
Class	3
Subsidiary risk	-
Label(s)	3
Packing group	III
Environmental hazards	
Marine pollutant	Yes
EmS	F-E, S-E
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code	Not applicable. However, this product is a liquid and if transported in bulk covered under MARPOL 73/78, Annex I.

15. Regulatory information

US federal regulations

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

n-Nonane (CAS 111-84-2)	1.0 % One-Time Export Notification only.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Not listed.

CERCLA Hazardous Substance List (40 CFR 302.4)

Hexane (Other isomers) (CAS 96-14-0)	LISTED
Naphthalene (CAS 91-20-3)	LISTED
n-Heptane (CAS 142-82-5)	LISTED
n-Hexane (CAS 110-54-3)	LISTED
n-Nonane (CAS 111-84-2)	LISTED
Octane (All isomers) (CAS 111-65-9)	LISTED

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories	Immediate Hazard - No Delayed Hazard - No Fire Hazard - No Pressure Hazard - No Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical	Yes

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Naphthalene	91-20-3	0 - 1

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Naphthalene (CAS 91-20-3)
n-Hexane (CAS 110-54-3)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations WARNING: This product contains chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

US. Massachusetts RTK - Substance List

Hexane (Other isomers) (CAS 96-14-0)
Naphthalene (CAS 91-20-3)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
n-Nonane (CAS 111-84-2)
Octane (All isomers) (CAS 111-65-9)

US. New Jersey Worker and Community Right-to-Know Act

Fuels, diesel, no. 2 (CAS 68476-34-6)
Naphthalene (CAS 91-20-3)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
n-Nonane (CAS 111-84-2)
Octane (All isomers) (CAS 111-65-9)

US. Pennsylvania Worker and Community Right-to-Know Law

Fuels, diesel, no. 2 (CAS 68476-34-6)
Hexane (Other isomers) (CAS 96-14-0)
Naphthalene (CAS 91-20-3)
n-Heptane (CAS 142-82-5)
n-Hexane (CAS 110-54-3)
n-Nonane (CAS 111-84-2)
Octane (All isomers) (CAS 111-65-9)

US. Rhode Island RTK

Naphthalene (CAS 91-20-3)
n-Hexane (CAS 110-54-3)

US. California Proposition 65

US - California Proposition 65 - Carcinogens & Reproductive Toxicity (CRT): Listed substance

Benzene (CAS 71-43-2)
Toluene (CAS 108-88-3)

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	No
China	Inventory of Existing Chemical Substances in China (IECSC)	No
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	No
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	No
Korea	Existing Chemicals List (ECL)	No
New Zealand	New Zealand Inventory	No
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No

Country(s) or region	Inventory name	On inventory (yes/no)*
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates this product complies with the inventory requirements administered by the governing country(s).
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

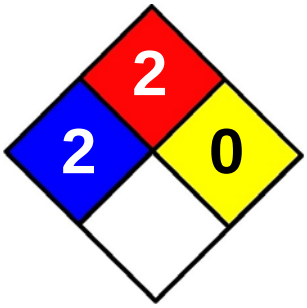
Issue date 13-May-2013

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Version # 04

Further information HMIS® is a registered trade and service mark of the NPCA.

NFPA Ratings



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SAFETY DATA SHEET

1. Identification

Product identifier	**Diesel Range Organics #1 - GRO/DRO**
Other means of identification	
Item	M-TPH5X5
Recommended use	For Laboratory Use Only
Recommended restrictions	None known.

Manufacturer/Importer/Supplier/Distributor information

Manufacturer

Company name	Chem Service, Inc.	
Address	660 Tower Lane West Chester, PA 19380 United States	
Telephone	Toll Free	800-452-9994
	Direct	610-692-3026
Website	www.chemservice.com	
E-mail	info@chemservice.com	
Emergency phone number	Chemtrec US	800-424-9300
	Chemtrec outside US	+1 703-527-3887

2. Hazard(s) identification

Physical hazards	Not classified.	
Health hazards	Acute toxicity, oral	Category 4
	Skin corrosion/irritation	Category 2
	Serious eye damage/eye irritation	Category 2A
	Carcinogenicity	Category 2
	Specific target organ toxicity, repeated exposure	Category 2
Environmental hazards	Not classified.	
OSHA defined hazards	Not classified.	

Label elements



Signal word	Warning
Hazard statement	Harmful if swallowed. Causes skin irritation. Causes serious eye irritation. Suspected of causing cancer. May cause damage to organs through prolonged or repeated exposure.

Precautionary statement

Prevention	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist or vapor. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Wear protective gloves/protective clothing/eye protection/face protection.
Response	If swallowed: Call a poison center/doctor if you feel unwell. If on skin: Wash with plenty of water. If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If exposed or concerned: Get medical advice/attention. Specific treatment (see this label). Rinse mouth. If skin irritation occurs: Get medical advice/attention. If eye irritation persists: Get medical advice/attention. Take off contaminated clothing and wash before reuse.
Storage	Store locked up.
Disposal	Dispose of contents/container in accordance with local/regional/national/international regulations.

Hazard(s) not otherwise classified (HNOC)	None known.
Supplemental information	1.4% of the mixture consists of component(s) of unknown acute oral toxicity.

3. Composition/information on ingredients

Mixtures

Chemical name	Common name and synonyms	CAS number	%
Methylene chloride	DICHLOROMETHANE; METHYLENE DICHLORIDE	75-09-2	98
n-Decane		124-18-5	0.2
n-Docosane		629-97-0	0.2
n-Dodecane		112-40-3	0.2
n-Eicosane		112-95-8	0.2
n-Hexacosane		630-01-3	0.2
n-Hexadecane		544-76-3	0.2
n-Octacosane		630-02-4	0.2
n-Octadecane		593-45-3	0.2
n-Tetracosane		646-31-1	0.2
n-Tetradecane		629-59-4	0.2

*Designates that a specific chemical identity and/or percentage of composition has been withheld as a trade secret.

4. First-aid measures

Inhalation Move to fresh air. Call a physician if symptoms develop or persist.

Skin contact Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse.

Eye contact Immediately flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical attention if irritation develops and persists.

Ingestion Rinse mouth. IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

Most important symptoms/effects, acute and delayed Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain. Prolonged exposure may cause chronic effects.

Indication of immediate medical attention and special treatment needed Provide general supportive measures and treat symptomatically. In case of shortness of breath, give oxygen. Keep victim warm. Keep victim under observation. Symptoms may be delayed.

General information IF exposed or concerned: Get medical advice/attention. Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

5. Fire-fighting measures

Suitable extinguishing media Water fog. Foam. Dry chemical powder. Carbon dioxide (CO2).

Unsuitable extinguishing media Do not use water jet as an extinguisher, as this will spread the fire.

Specific hazards arising from the chemical During fire, gases hazardous to health may be formed.

Special protective equipment and precautions for firefighters Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

Fire-fighting equipment/instructions Move containers from fire area if you can do so without risk.

Specific methods Use standard firefighting procedures and consider the hazards of other involved materials.

General fire hazards No unusual fire or explosion hazards noted.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures Keep unnecessary personnel away. Keep people away from and upwind of spill/leak. Keep out of low areas. Wear appropriate protective equipment and clothing during clean-up. Do not breathe mist or vapor. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing. Ensure adequate ventilation. Local authorities should be advised if significant spillages cannot be contained. For personal protection, see section 8 of the SDS.

Methods and materials for containment and cleaning up

Large Spills: Stop the flow of material, if this is without risk. Dike the spilled material, where this is possible. Cover with plastic sheet to prevent spreading. Absorb in vermiculite, dry sand or earth and place into containers. Prevent entry into waterways, sewer, basements or confined areas. Following product recovery, flush area with water.

Small Spills: Wipe up with absorbent material (e.g. cloth, fleece). Clean surface thoroughly to remove residual contamination.

Never return spills to original containers for re-use. For waste disposal, see section 13 of the SDS.

Environmental precautions Avoid discharge into drains, water courses or onto the ground.

7. Handling and storage

Precautions for safe handling Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe mist or vapor. Do not taste or swallow. Avoid contact with skin. Avoid contact with eyes. Avoid prolonged exposure. Avoid contact with clothing. Provide adequate ventilation. Wear appropriate personal protective equipment. Observe good industrial hygiene practices. When using, do not eat, drink or smoke. Wash hands thoroughly after handling.

Conditions for safe storage, including any incompatibilities Store locked up. Store in original tightly closed container. Refrigeration recommended. Store away from incompatible materials (see Section 10 of the SDS).

8. Exposure controls/personal protection

Occupational exposure limits

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Components	Type	Value
Methylene chloride (CAS 75-09-2)	STEL	125 ppm
	TWA	25 ppm

US. ACGIH Threshold Limit Values

Components	Type	Value
Methylene chloride (CAS 75-09-2)	TWA	50 ppm

Biological limit values

ACGIH Biological Exposure Indices

Components	Value	Determinant	Specimen	Sampling Time
Methylene chloride (CAS 75-09-2)	0.3 mg/l	Dichloromethane	Urine	*

* - For sampling details, please see the source document.

Appropriate engineering controls Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level. Eye wash facilities and emergency shower must be available when handling this product.

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin protection

Hand protection Wear appropriate chemical resistant gloves.

Other Wear appropriate chemical resistant clothing.

Respiratory protection In case of insufficient ventilation, wear suitable respiratory equipment.

Thermal hazards Wear appropriate thermal protective clothing, when necessary.

General hygiene considerations When using, do not eat, drink or smoke. Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants.

9. Physical and chemical properties

Appearance

Physical state Liquid.

Form Liquid

Color Not available.

Odor Not available.

Odor threshold Not available.

pH Not available.

Melting point/freezing point -139 °F (-95 °C) estimated

Initial boiling point and boiling range	103.55 °F (39.75 °C) estimated
Flash point	Not available.
Evaporation rate	Not available.
Flammability (solid, gas)	Not available.
Upper/lower flammability or explosive limits	
Flammability limit - lower (%)	15.5 % estimated
Flammability limit - upper (%)	66.4 % estimated
Explosive limit - lower (%)	Not available.
Explosive limit - upper (%)	Not available.
Vapor pressure	579.97 hPa estimated
Vapor density	Not available.
Relative density	Not available.
Solubility(ies)	
Solubility (water)	Not available.
Partition coefficient (n-octanol/water)	Not available.
Auto-ignition temperature	1033 °F (556.11 °C) estimated
Decomposition temperature	Not available.
Viscosity	Not available.
Other information	
Density	1.32077 g/cm3 estimated
Percent volatile	98 % estimated
Specific gravity	1.32 estimated
VOC (Weight %)	98 % estimated

10. Stability and reactivity

Reactivity	The product is stable and non-reactive under normal conditions of use, storage and transport.
Chemical stability	Material is stable under normal conditions.
Possibility of hazardous reactions	Hazardous polymerization does not occur.
Conditions to avoid	Contact with incompatible materials.
Incompatible materials	Strong oxidizing agents.
Hazardous decomposition products	No hazardous decomposition products are known.

11. Toxicological information

Information on likely routes of exposure

Ingestion	Harmful if swallowed.
Inhalation	Prolonged inhalation may be harmful. May cause damage to organs by inhalation.
Skin contact	Causes skin irritation.
Eye contact	Causes serious eye irritation.
Symptoms related to the physical, chemical and toxicological characteristics	Symptoms may include stinging, tearing, redness, swelling, and blurred vision. Skin irritation. May cause redness and pain.

Information on toxicological effects

Acute toxicity Harmful if swallowed.

Components	Species	Test Results
Methylene chloride (CAS 75-09-2)		
Acute		
Dermal		
LD50	Rat	> 2000 mg/kg
Inhalation		
LC50	Guinea pig	11600 ppm, 6 Hours

Components	Species	Test Results
		40.2 mg/l, 6 Hours
	Mouse	14400 ppm, 7 Hours
		51.5 mg/l, 2 Hours
		49.1 mg/l, 6 Hours
		49 mg/l, 7 Hours
	Rat	2000 mg/l, 15 Minutes
		88 mg/l, 900 Days
		79 mg/l, 2 Hours
		52 mg/l, 6 Hours
LD50	Mouse	16000 ppm, 7 Hours
Oral		
LD50	Rat	1600 mg/kg
Other		
LD50	Mouse	437 mg/kg
n-Decane (CAS 124-18-5)		
Acute		
Dermal		
LD50	Rabbit	>= 3160 mg/kg
	Rat	> 2000 mg/kg
Inhalation		
LC50	Monkey	>= 11160 mg/m3
	Mouse	72.3 mg/l, 2 Hours
	Rat	> 5000 mg/m3, 8 Hours
		> 4951 mg/m3, 4 Hours
		> 41 ppm, 8 Hours
Oral		
LD50	Rat	> 5000 mg/kg
n-Dodecane (CAS 112-40-3)		
Acute		
Dermal		
LD50	Rabbit	>= 3160 mg/kg
	Rat	> 2000 mg/kg
Inhalation		
LC50	Monkey	>= 11160 mg/m3
	Rat	> 5000 mg/m3, 8 Hours
		> 4951 mg/m3, 4 Hours
		> 41 ppm, 8 Hours
Oral		
LD50	Rat	> 5000 mg/kg
n-Tetradecane (CAS 629-59-4)		
Acute		
Dermal		
LD50	Rabbit	>= 3160 mg/kg
	Rat	> 2000 mg/kg
Inhalation		
LC50	Monkey	>= 11160 mg/m3
	Rat	> 5000 mg/m3, 8 Hours
		> 4951 mg/m3, 4 Hours
		> 41 ppm, 8 Hours

Components	Species	Test Results
Oral		
LD50	Rat	> 5000 mg/kg

* Estimates for product may be based on additional component data not shown.

Skin corrosion/irritation Causes skin irritation.

Serious eye damage/eye irritation Causes serious eye irritation.

Respiratory or skin sensitization

Respiratory sensitization Not available.

Skin sensitization This product is not expected to cause skin sensitization.

Germ cell mutagenicity No data available to indicate product or any components present at greater than 0.1% are mutagenic or genotoxic.

Carcinogenicity Suspected of causing cancer.

IARC Monographs. Overall Evaluation of Carcinogenicity

Methylene chloride (CAS 75-09-2) 2B Possibly carcinogenic to humans.

US. National Toxicology Program (NTP) Report on Carcinogens

Methylene chloride (CAS 75-09-2) Reasonably Anticipated to be a Human Carcinogen.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Methylene chloride (CAS 75-09-2) Cancer

Reproductive toxicity This product is not expected to cause reproductive or developmental effects.

Specific target organ toxicity - single exposure Not classified.

Specific target organ toxicity - repeated exposure May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard Not available.

Chronic effects Prolonged inhalation may be harmful. Prolonged exposure may cause chronic effects. May cause damage to organs through prolonged or repeated exposure.

12. Ecological information

Ecotoxicity The product is not classified as environmentally hazardous. However, this does not exclude the possibility that large or frequent spills can have a harmful or damaging effect on the environment.

Components		Species	Test Results
Methylene chloride (CAS 75-09-2)			
Aquatic			
Crustacea	EC50	Water flea (Daphnia magna)	1250 mg/l, 48 hours
Fish	LC50	Fathead minnow (Pimephales promelas)	140.8 - 277.8 mg/l, 96 hours
n-Decane (CAS 124-18-5)			
Aquatic			
Fish	LC50	Sheepshead minnow (Cyprinodon variegatus)	> 500 mg/l, 96 hours
n-Docosane (CAS 629-97-0)			
Aquatic			
Fish	LC50	Sheepshead minnow (Cyprinodon variegatus)	> 500 mg/l, 96 hours

* Estimates for product may be based on additional component data not shown.

Persistence and degradability No data is available on the degradability of this product.

Bioaccumulative potential No data available.

Partition coefficient n-octanol / water (log Kow)

Methylene chloride	1.25
n-Decane	5.01
n-Hexadecane	8.25
n-Tetradecane	7.2

Mobility in soil No data available.

Other adverse effects No other adverse environmental effects (e.g. ozone depletion, photochemical ozone creation potential, endocrine disruption, global warming potential) are expected from this component.

13. Disposal considerations

Disposal instructions Collect and reclaim or dispose in sealed containers at licensed waste disposal site. This material and its container must be disposed of as hazardous waste. Do not allow this material to drain into sewers/water supplies. Do not contaminate ponds, waterways or ditches with chemical or used container. Dispose of contents/container in accordance with local/regional/national/international regulations.

Local disposal regulations Dispose in accordance with all applicable regulations.

Hazardous waste code The waste code should be assigned in discussion between the user, the producer and the waste disposal company.

US RCRA Hazardous Waste U List: Reference

Methylene chloride (CAS 75-09-2) U080

Waste from residues / unused products Dispose of in accordance with local regulations. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe manner (see: Disposal instructions).

Contaminated packaging Empty containers should be taken to an approved waste handling site for recycling or disposal. Since emptied containers may retain product residue, follow label warnings even after container is emptied.

14. Transport information

DOT

UN number	UN1593
UN proper shipping name	Dichloromethane, solution
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Label(s)	6.1
Packing group	III
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Special provisions	IB3, IP8, N36, T7, TP2
Packaging exceptions	153
Packaging non bulk	203
Packaging bulk	241

IATA

UN number	UN1593
UN proper shipping name	Dichloromethane solution
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Packing group	III
Environmental hazards	No.
ERG Code	6L
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.
Other information	
Passenger and cargo aircraft	Allowed.
Cargo aircraft only	Allowed.

IMDG

UN number	UN1593
UN proper shipping name	DICHLOROMETHANE SOLUTION
Transport hazard class(es)	
Class	6.1(PGIII)
Subsidiary risk	-
Packing group	III
Environmental hazards	
Marine pollutant	No.
EmS	F-A, S-A
Special precautions for user	Read safety instructions, SDS and emergency procedures before handling.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not available.

DOT



IATA; IMDG



15. Regulatory information

US federal regulations This product is a "Hazardous Chemical" as defined by the OSHA Hazard Communication Standard, 29 CFR 1910.1200.
All components are on the U.S. EPA TSCA Inventory List.

TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D)

Not regulated.

CERCLA Hazardous Substance List (40 CFR 302.4)

Methylene chloride (CAS 75-09-2) Listed.

SARA 304 Emergency release notification

Not regulated.

US. OSHA Specifically Regulated Substances (29 CFR 1910.1001-1050)

Methylene chloride (CAS 75-09-2)
Cancer
Heart
Central nervous system
Liver
Skin irritation
Eye irritation

Superfund Amendments and Reauthorization Act of 1986 (SARA)

Hazard categories
Immediate Hazard - Yes
Delayed Hazard - Yes
Fire Hazard - No
Pressure Hazard - No
Reactivity Hazard - No

SARA 302 Extremely hazardous substance

Not listed.

SARA 311/312 Hazardous chemical No

SARA 313 (TRI reporting)

Chemical name	CAS number	% by wt.
Methylene chloride	75-09-2	98

Other federal regulations

Clean Air Act (CAA) Section 112 Hazardous Air Pollutants (HAPs) List

Methylene chloride (CAS 75-09-2)

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)

Not regulated.

Safe Drinking Water Act (SDWA) Not regulated.

US state regulations

US. Massachusetts RTK - Substance List

Methylene chloride (CAS 75-09-2)

US. New Jersey Worker and Community Right-to-Know Act

Methylene chloride (CAS 75-09-2) 500 LBS

US. Pennsylvania RTK - Hazardous Substances

Methylene chloride (CAS 75-09-2)
n-Decane (CAS 124-18-5)

US. Rhode Island RTK

Methylene chloride (CAS 75-09-2)

US. California Proposition 65

WARNING: This product contains a chemical known to the State of California to cause cancer.

US - California Proposition 65 - CRT: Listed date/Carcinogenic substance

Methylene chloride (CAS 75-09-2) Listed: April 1, 1988

International Inventories

Country(s) or region	Inventory name	On inventory (yes/no)*
Australia	Australian Inventory of Chemical Substances (AICS)	No
Canada	Domestic Substances List (DSL)	No
Canada	Non-Domestic Substances List (NDSL)	Yes
China	Inventory of Existing Chemical Substances in China (IECSC)	Yes
Europe	European Inventory of Existing Commercial Chemical Substances (EINECS)	Yes
Europe	European List of Notified Chemical Substances (ELINCS)	No
Japan	Inventory of Existing and New Chemical Substances (ENCS)	Yes
Korea	Existing Chemicals List (ECL)	Yes
New Zealand	New Zealand Inventory	Yes
Philippines	Philippine Inventory of Chemicals and Chemical Substances (PICCS)	No
United States & Puerto Rico	Toxic Substances Control Act (TSCA) Inventory	Yes

*A "Yes" indicates that all components of this product comply with the inventory requirements administered by the governing country(s)
A "No" indicates that one or more components of the product are not listed or exempt from listing on the inventory administered by the governing country(s).

16. Other information, including date of preparation or last revision

Issue date 08-16-2014

Version # 01

NFPA ratings Health: 2
Flammability: 1
Instability: 0

Disclaimer The above information is believed to be correct on the date it was last revised and must not be considered all inclusive. The information has been obtained only by a search of available literature and is only a guide for handling the chemicals. OSHA regulations require that if other hazards become evident, an upgraded SDS must be made available to the employee within three months. RESPONSIBILITY for updates lies with the employer and not with CHEM SERVICE, Inc.

Persons not specifically and properly trained should not handle this chemical or its container. This product is furnished FOR LABORATORY USE ONLY! Our products may NOT BE USED as drugs, cosmetics, agricultural or pesticide products, food additives or as household chemicals.

This Safety Data Sheet (SDS) is intended only for use with Chem Service, Inc. products and should not be relied on for use with materials from any other supplier even if the chemical name(s) on the product are identical! Whenever using an SDS for a solution or mixture the user should refer to the SDS for every component of the solution or mixture. Chem Service warrants that this SDS is based upon the most current information available to Chem Service at the time it was last revised. THIS WARRANTY IS EXCLUSIVE, AND CHEM SERVICE, INC. MAKES NO OTHER WARRANTY, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. This SDS is provided gratis and CHEM SERVICE, INC. SHALL NOT BE LIABLE FOR ANY INCIDENTAL, CONSEQUENTIAL OR CONTINGENT DAMAGES.

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This product is furnished FOR LABORATORY USE ONLY.

SAFETY DATA SHEET

Version 4.8
Revision Date 06/09/2016
Print Date 11/14/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Endosulfan I (alpha)

Product Number : 48576
Brand : Supelco

CAS-No. : 959-98-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 2), H330
Acute toxicity, Dermal (Category 4), H312
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H300 + H330 Fatal if swallowed or if inhaled
H312 Harmful in contact with skin.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.

P280	Wear protective gloves/ protective clothing.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of water.Call a POISON CENTER/doctor if you feel unwell.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C9H6Cl6O3S
Molecular weight	:	406.93 g/mol
CAS-No.	:	959-98-8

Hazardous components

Component	Classification	Concentration
Endosulfan (α isomer)		
	Acute Tox. 2; Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H300 + H330, H312, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.
Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm

Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	108.0 - 110.0 °C (226.4 - 230.0 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available

q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

12.1 Toxicity

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation other fish - 21 d
- 0.2 µg/l

Bioconcentration factor (BCF): 10,994

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (Endosulfan (α isomer))
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Endosulfan (α isomer))

IATA

UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (Endosulfan (α isomer))

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Endosulfan (α isomer)	959-98-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Endosulfan (α isomer)	959-98-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Endosulfan (α isomer)	959-98-8	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H300	Fatal if swallowed.
H300 + H330	Fatal if swallowed or if inhaled
H312	Harmful in contact with skin.
H330	Fatal if inhaled.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	4
Fire Hazard:	0
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.8 Revision Date: 06/09/2016 Print Date: 11/14/2016

SAFETY DATA SHEET

Version 5.1
Revision Date 06/27/2014
Print Date 04/20/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Endosulfan sulfate

Product Number : 36676
Brand : Sigma

CAS-No. : 1031-07-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H300
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H300 Fatal if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P321 Specific treatment (see supplemental first aid instructions on this label).
P330 Rinse mouth.
P391 Collect spillage.
P405 Store locked up.

P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : $C_9H_6Cl_6O_4S$
Molecular Weight : 422.92 g/mol
CAS-No. : 1031-07-8

Hazardous components

Component	Classification	Concentration
Endosulfan sulfate		
	Acute Tox. 2; Aquatic Acute 1; Aquatic Chronic 1; H300, H410	-

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
no data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Sulphur oxides

5.3 Advice for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

5.4 Further information
no data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Normal measures for preventive fire protection.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	no data available
c)	Odour Threshold	no data available
d)	pH	no data available
e)	Melting point/freezing point	179.0 - 182.0 °C (354.2 - 359.6 °F)
f)	Initial boiling point and boiling range	no data available
g)	Flash point	no data available
h)	Evapouration rate	no data available
i)	Flammability (solid, gas)	no data available
j)	Upper/lower flammability or explosive limits	no data available
k)	Vapour pressure	no data available
l)	Vapour density	no data available
m)	Relative density	no data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 3.66
p)	Auto-ignition temperature	no data available
q)	Decomposition temperature	no data available
r)	Viscosity	no data available
s)	Explosive properties	no data available
t)	Oxidizing properties	no data available

9.2 Other safety information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
no data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
no data available

10.4 Conditions to avoid
no data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - no data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - rat - 18.0 mg/kg

Inhalation: no data available

Dermal: no data available

no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitisation
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
no data available

no data available

Specific target organ toxicity - single exposure
no data available

Specific target organ toxicity - repeated exposure
no data available

Aspiration hazard
no data available

Additional Information
RTECS: RB9150000

Cholinesterase inhibitors can cause heavy salivation and secretion in the lungs, lachrymation, blurred vision, involuntary defecation, diarrhea, tremor, ataxia, sweating, hypothermia, lowered heart rate, and/or a fall in blood pressure as a result of their action at cholinergic nerve sites., Headache, Nausea, Vomiting, Dizziness, Drowsiness, Confusion., Weakness, Muscle cramps/spasms., Change in pupil size., Fever, Seizures., Incoordination., Convulsions, Coma.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Carassius auratus (goldfish) - > 0.01 - < 0.1 mg/l - 48.0 h
	LC50 - Leuciscus idus (Golden orfe) - > 0.01 - < 0.1 mg/l - 48.0 h
	LC50 - other fish - > 0.001 - < 0.01 mg/l - 48.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.76 mg/l - 48 h
	LC50 - Daphnia magna (Water flea) - > 0.1 - < 1 mg/l - 48 h

12.2 Persistence and degradability
no data available

12.3 Bioaccumulative potential
no data available

12.4 Mobility in soil
no data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solids, organic, n.o.s. (Endosulfan sulfate)
Reportable Quantity (RQ): 1 lbs
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Endosulfan sulfate)
Marine pollutant: No

IATA
UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solid, organic, n.o.s. (Endosulfan sulfate)

15. REGULATORY INFORMATION

SARA 302 Components
SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Endosulfan sulfate	1031-07-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Endosulfan sulfate	1031-07-8	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Endosulfan sulfate	1031-07-8	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H300	Fatal if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.1 Revision Date: 06/27/2014 Print Date: 04/20/2016

SAFETY DATA SHEET

Version 5.5
Revision Date 08/09/2016
Print Date 07/31/2019

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name	:	Endrin
Product Number	:	49032
Brand	:	Supelco
Index-No.	:	602-051-00-X
CAS-No.	:	72-20-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich 3050 Spruce Street SAINT LOUIS MO 63103 USA
Telephone	:	+1 800-325-5832
Fax	:	+1 800-325-5052

1.4 Emergency telephone number

Emergency Phone #	:	+1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 1), H300
Acute toxicity, Dermal (Category 2), H310
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word — Danger

Hazard statement(s)

H300 + H310	Fatal if swallowed or in contact with skin
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P262	Do not get in eyes, on skin, or on clothing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse

	mouth.
P302 + P350 + P310	IF ON SKIN: Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/ physician.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_{12}H_8Cl_6O$
Molecular weight	:	380.91 g/mol
CAS-No.	:	72-20-8
EC-No.	:	200-775-7
Index-No.	:	602-051-00-X

Hazardous components

Component	Classification	Concentration
Endrin		
	Acute Tox. 1; Acute Tox. 2; Aquatic Acute 1; Aquatic Chronic 1; H300 + H310, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Endrin	72-20-8	TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Headache Liver damage Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	0.100000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	0.100000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		

		PEL	0.1 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available

f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	log Pow: 5.20
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	226.0 °C (438.8 °F) -
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 3.0 mg/kg

Inhalation: No data available

LD50 Dermal - Rabbit - 60.0 mg/kg

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - < 0.001 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia pulex (Water flea) - 0.02 mg/l - 48 h
	Immobilization EC50 - Daphnia magna (Water flea) - 0.0042 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: Pimephales promelas (fathead minnow) - 56 d - 0.63 mg/l

Bioconcentration factor (BCF): 13,000

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solids, organic, n.o.s. (Endrin)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Endrin)
Marine pollutant:yes

IATA
UN number: 2811 Class: 6.1 Packing group: I
Proper shipping name: Toxic solid, organic, n.o.s. (Endrin)

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Endrin	72-20-8	2007-07-01

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Endrin	72-20-8	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Endrin	72-20-8	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Endrin	72-20-8	2007-07-01

California Prop. 65 Components
WARNING: This product contains a chemical known to the CAS-No. Revision Date

State of California to cause birth defects or other reproductive harm. Endrin	72-20-8	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H300	Fatal if swallowed.
H300 + H310	Fatal if swallowed or in contact with skin
H310	Fatal in contact with skin.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 08/09/2016 Print Date: 07/31/2019

MATHESON
ask. . .The Gas Professionals™

Safety Data Sheet

Material Name: ETHYL BENZENE **SDS ID: MAT08780**

Section 1 - PRODUCT AND COMPANY IDENTIFICATION

Material Name
ETHYL BENZENE
Synonyms
MTG MSDS 185; EB; PHENYLETHANE; ETHYLBENZENE; ETHYLBENZOL; ALPHA-METHYLTOLUENE; UN 1175; C8H10
Chemical Family
Hydrocarbons, aromatic
Product Use
industrial.
Restrictions on Use
None known.
Details of the supplier of the safety data sheet
MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920
General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

Section 2 - HAZARDS IDENTIFICATION

Classification in accordance with paragraph (d) of 29 CFR 1910.1200.
Flammable Liquids - Category 2
Aspiration Hazard - Category 1
Acute Toxicity - Inhalation - Dust/Mist - Category 4
Acute Toxicity - Inhalation - Vapor - Category 4
Skin Corrosion/Irritation - Category 2
Serious Eye Damage/Eye Irritation - Category 2A
Carcinogenicity - Category 2
Reproductive Toxicity - Category 1B
Specific target organ toxicity - Single exposure - Category 2
Specific target organ toxicity - Single exposure - Category 3
Specific Target Organ Toxicity - Repeated Exposure - Category 2 (ears , Ears)
Hazardous to the Aquatic Environment - Acute - Category 2
Hazardous to the Aquatic Environment - Chronic - Category 2
GHS Label Elements
Symbol(s)



Signal Word
Danger
Hazard Statement(s)

Highly flammable liquid and vapor.
Harmful if inhaled.
Causes skin irritation.
Causes serious eye irritation.
Suspected of causing cancer.
May damage fertility or the unborn child.
May cause damage to organs. (central nervous system)
May cause respiratory irritation.
May be fatal if swallowed and enters airways.
Toxic to aquatic life.

Precautionary Statement(s)

Prevention

Keep away from heat, sparks, open flame, and hot surfaces - No smoking.
Keep container tightly closed.
Ground/Bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Use Personal Protective equipment as required.
Do not breathe vapor or mist.
Use only outdoors or in a well-ventilated area.
Wear protective gloves and eye/face protection.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Avoid release to the environment.

Response

In case of fire, use media appropriate for extinction.
IF exposed or concerned: Get medical advice/attention.
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
Call a POISON CENTER or doctor/physician if you feel unwell.
IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
If skin irritation occurs: Get medical advice/attention.
Wash contaminated clothing before reuse.
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do.
Continue rinsing.
If eye irritation persists: Get medical advice/attention.
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician.
Do NOT induce vomiting.

Storage

Store in a well-ventilated place.
Keep cool.
Keep container tightly closed.
Store locked up.

Disposal

Dispose in accordance with all applicable regulations.

Statement(s) of Unknown Acute Toxicity

Inhalation 0% of the mixture consists of ingredient(s) of unknown acute toxicity.

Statement(s) of Unknown Aquatic Toxicity
0% of the mixture consists of ingredient(s) of unknown acute aquatic toxicity.
0% of the mixture consists of ingredient(s) of unknown chronic aquatic toxicity.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

CAS	Component Name	Percent
100-41-4	ETHYL BENZENE	100

Section 4 - FIRST AID MEASURES

Inhalation
If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.
Skin
Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.
Eyes
Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.
Ingestion
aspiration hazard. Do NOT induce vomiting. When vomiting occurs, keep head lower than hips to help prevent aspiration. Get medical attention immediately. Give artificial respiration if not breathing.
Most Important Symptoms/Effects
Acute
respiratory tract irritation, skin irritation, eye irritation, central nervous system damage, lung damage (from aspiration)
Delayed
cancer, Reproductive Effects
Note to Physicians
For inhalation, consider oxygen.

Section 5 - FIRE FIGHTING MEASURES

Extinguishing Media
Suitable Extinguishing Media
regular dry chemical, carbon dioxide, water spray, regular foam, Large fires: Use water spray, fog or regular foam.
Unsuitable Extinguishing Media
Do not use high-pressure water streams.
Special Hazards Arising from the Chemical
Severe fire hazard. Vapor/air mixtures are explosive above flash point. The vapor is heavier than air. Vapors or gases may ignite at distant ignition sources and flash back. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion.
Hazardous Combustion Products
Oxides of carbon
Fire Fighting Measures
Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank,

rail car or tank truck: Evacuation radius: 800 meters (1/2 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Do not scatter spilled material with high-pressure water streams. Cool containers with water spray until well after the fire is out. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Water may be ineffective.

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

Section 6 - ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8.

Methods and Materials for Containment and Cleaning Up

Avoid heat, flames, sparks and other sources of ignition. Eliminate all ignition sources if safe to do so. All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if possible without personal risk. Prevent entry into waterways, sewers, basements, or confined areas. Reduce vapors with water spray. Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. Dike for later disposal. Remove sources of ignition. Use water spray to reduce vapors or divert vapor cloud drift. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

Environmental Precautions

Avoid release to the environment.

Section 7 - HANDLING AND STORAGE

Precautions for Safe Handling

Keep away from heat, sparks, open flame, and hot surfaces - No smoking. Keep container tightly closed. Ground/bond container and receiving equipment. Use explosion-proof electrical/ventilating/lighting equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use Personal Protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves/eye protection/face protection. Wash hands thoroughly after handling. Do not eat, drink, or smoke when using this product. Avoid release to the environment.

Conditions for Safe Storage, Including any Incompatibilities

Store in a well-ventilated place.
Keep cool.
Keep container tightly closed.
Store locked up.
Store and handle in accordance with all current regulations and standards. Store in a well-ventilated area. Keep cool. Keep container tightly closed. Keep locked up. Grounding and bonding required. Keep separated from incompatible substances. Protect from physical damage. Store outside or in a detached building. Store with flammable liquids. Subject to storage regulations: U.S. OSHA 29 CFR 1910.106.

Incompatible Materials

Acids, bases, oxidizing materials, combustible materials

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

Component Exposure Limits

ETHYL BENZENE	**100-41-4**

ACGIH:	20 ppm TWA
NIOSH:	100 ppm TWA ; 435 mg/m3 TWA
	125 ppm STEL ; 545 mg/m3 STEL
	800 ppm IDLH (10% LEL)
Europe:	100 ppm TWA ; 442 mg/m3 TWA
	Possibility of significant uptake through the skin
	200 ppm STEL ; 884 mg/m3 STEL
OSHA (US):	100 ppm TWA ; 435 mg/m3 TWA
Mexico:	100 ppm TWA VLE-PPT ; 435 mg/m3 TWA VLE-PPT
	125 ppm STEL [PPT-CT]; 545 mg/m3 STEL [PPT-CT]

ACGIH - Threshold Limit Values - Biological Exposure Indices (BEI)
ETHYL BENZENE (100-41-4)
0.15 g/g creatinine Medium: urine Time: end of shift Parameter: Sum of mandelic acid and phenylglyoxylic acid (nonspecific)

Engineering Controls
Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eye/face protection
Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection
Wear appropriate chemical resistant clothing.

Respiratory Protection
The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA. 800 ppm. Any air-purifying half-mask respirator equipped with organic vapor cartridge(s). Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister. Any powered, air-purifying respirator with organic vapor cartridge(s). Any supplied-air respirator. Any self-contained breathing apparatus with a full facepiece. Emergency or planned entry into unknown concentrations or IDLH conditions -. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Escape -. Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister. Any appropriate escape-type, self-contained breathing apparatus. Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode. Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.

Glove Recommendations
Wear appropriate chemical resistant gloves.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance	Clear, colorless liquid	**Physical State**	liquid
Odor	aromatic odor	**Color**	colorless
Odor Threshold	140 ppm	**pH**	Not available
Melting Point	-95 °C (-139 °F)	**Boiling Point**	136 °C (277 °F)
Boiling Point Range	Not available	**Freezing point**	Not available
Evaporation Rate	<1 (Butyl acetate = 1)	**Flammability (solid, gas)**	Not available
Autoignition Temperature	432 °C (810 °F)	**Flash Point**	15 °C Closed Cup (59 °F)
Lower Explosive Limit	0.8 %	**Decomposition temperature**	Not available
Upper Explosive Limit	6.7 %	**Vapor Pressure**	7.1 mmHg @ 20 °C
Vapor Density (air=1)	3.66	**Specific Gravity (water=1)**	0.867
Water Solubility	0.015 %	**Partition coefficient: n-octanol/water**	154170.05
Viscosity	0.64 cp	**Kinematic viscosity**	Not available
Solubility (Other)	Not available	**Bioconcentration Factor (BCF)**	36.39
Density	Not available	**Henry's Law Constant**	0.00788 atm-m3/mole
KOC	520 (Estimated)	**Physical Form**	liquid
Volatility	100 %	**Molecular Formula**	C-H3-C-H2-C6-H5
Molecular Weight	106.17	**OSHA Flammability Class**	IB

Solvent Solubility
Soluble
alcohol, ether, Benzene, sulfur dioxide, carbon tetrachloride
Insoluble
ammonia

Section 10 - STABILITY AND REACTIVITY

Reactivity
No reactivity hazard is expected.
Chemical Stability
Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions
Will not polymerize.
Conditions to Avoid
Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat. Keep out of water supplies and sewers.
Incompatible Materials
Acids, bases, oxidizing materials, combustible materials
Hazardous decomposition products
Oxides of carbon

Section 11 - TOXICOLOGICAL INFORMATION

Information on Likely Routes of Exposure
Inhalation
irritation (possibly severe), chest pain, difficulty breathing, emotional disturbances, headache, drowsiness, dizziness, loss of coordination, coma, cancer
Skin Contact
irritation
Eye Contact
irritation
Ingestion
nausea, vomiting, stomach pain, aspiration hazard
Acute and Chronic Toxicity
Component Analysis - LD50/LC50
The components of this material have been reviewed in various sources and the following selected endpoints are published:
ETHYL BENZENE (100-41-4)
Oral LD50 Rat 3500 mg/kg
Dermal LD50 Rabbit 15400 mg/kg
Inhalation LC50 Rat 17.4 mg/L 4 h
Product Toxicity Data
Acute Toxicity Estimate

Dermal	> 2000 mg/kg
Inhalation - Vapor	17.4 mg/L
Oral	> 2000 mg/kg

Immediate Effects
respiratory tract irritation, skin irritation, eye irritation, central nervous system damage, lung damage (from aspiration)
Delayed Effects
Reproductive Effects, cancer
Irritation/Corrosivity Data
respiratory tract irritation, skin irritation, eye irritation
Respiratory Sensitization
No data available.
Dermal Sensitization
No data available.
Component Carcinogenicity

ETHYL BENZENE	**100-41-4**
ACGIH:	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans
IARC:	Monograph 77 [2000] (Group 2B (possibly carcinogenic to humans))
DFG:	Category 4 (no significant contribution to human cancer)
OSHA:	Present

Germ Cell Mutagenicity
No data available.
Tumorigenic Data
No data available
Reproductive Toxicity
Available data characterizes components of this product as reproductive hazards.
Specific Target Organ Toxicity - Single Exposure
central nervous system, Respiratory system
Specific Target Organ Toxicity - Repeated Exposure
No target organs identified.
Aspiration hazard
This material is an aspiration hazard.
Medical Conditions Aggravated by Exposure
kidney disorders, liver disorders, respiratory disorders, skin disorders and allergies
Additional Data
May cross the placenta.

Section 12 - ECOLOGICAL INFORMATION

Ecotoxicity
Toxic to aquatic life.
Component Analysis - Aquatic Toxicity

ETHYL BENZENE	**100-41-4**
Fish:	LC50 96 h Oncorhynchus mykiss 11 - 18 mg/L [static]; LC50 96 h Oncorhynchus mykiss 4.2 mg/L [semi-static]; LC50 96 h Pimephales promelas 7.55 - 11 mg/L [flow-through]; LC50 96 h Lepomis macrochirus 32 mg/L [static]; LC50 96 h Pimephales promelas 9.1 - 15.6 mg/L [static]; LC50 96 h Poecilia reticulata 9.6 mg/L [static]
Algae:	EC50 72 h Pseudokirchneriella subcapitata 4.6 mg/L IUCLID ; EC50 96 h Pseudokirchneriella subcapitata >438 mg/L IUCLID ; EC50 72 h Pseudokirchneriella subcapitata 2.6 - 11.3 mg/L [static] EPA ; EC50 96 h Pseudokirchneriella subcapitata 1.7 - 7.6 mg/L [static] EPA
Invertebrate:	EC50 48 h Daphnia magna 1.8 - 2.4 mg/L IUCLID

Persistence and Degradability
Not expected to undergo hydrolysis in the environment.
Bioaccumulative Potential
Bioconcentration potential in aquatic organisms is low based on a BCF value of 15.
Mobility

Expected to have moderate mobility in soil.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Methods
Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262.
Hazardous Waste Number(s): D001.
Component Waste Numbers
The U.S. EPA has not published waste numbers for this product's components.

Section 14 - TRANSPORT INFORMATION

US DOT Information:
Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN/NA #: UN1175
Packing Group: II
Required Label(s): 3
Marine pollutant

IMDG Information:
Shipping Name: ETHYLBENZENE
Hazard Class: 3
UN#: UN1175
Packing Group: II
Required Label(s): 3
Marine pollutant
International Bulk Chemical Code
This material contains one or more of the following chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

ETHYL BENZENE	**100-41-4**
IBC Code:	Category Y

Section 15 - REGULATORY INFORMATION

U.S. Federal Regulations
This material contains one or more of the following chemicals required to be identified under SARA Section 302 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

ETHYL BENZENE	**100-41-4**
SARA 313:	0.1 % de minimis concentration
CERCLA:	1000 lb final RQ ; 454 kg final RQ

SARA Section 311/312 (40 CFR 370 Subparts B and C) reporting categories
Flammable; Carcinogenicity; Acute toxicity; Reproductive Toxicity; Skin Corrosion/Irritation; Serious Eye Damage/Eye Irritation; Specific Target Organ Toxicity; Aspiration Hazard
U.S. State Regulations
The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
ETHYL BENZENE	**100-41-4**	Yes	Yes	Yes	Yes	Yes

The following statement(s) are provided under the California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65):
WARNING! This product contains a chemical known to the state of California to cause cancer

ETHYL BENZENE	**100-41-4**
Carc:	carcinogen , 6/11/2004

Canada Regulations
Canadian WHMIS Ingredient Disclosure List (IDL)
Components of this material have been checked against the Canadian WHMIS Ingredients Disclosure List. The List is composed of chemicals which must be identified on MSDSs if they are included in products which meet WHMIS criteria specified in the Controlled Products Regulations and are present above the threshold limits listed on the IDL

ETHYL BENZENE	**100-41-4**
	0.1 %

WHMIS Classification
B2
Component Analysis - Inventory
ETHYL BENZENE (100-41-4)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN - NCI (Draft)
Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	No	No	Yes	Yes	Yes	Yes	Yes

Section 16 - OTHER INFORMATION

NFPA Ratings
Health: 2 Fire: 3 Reactivity: 0
Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe
Summary of Changes
Updated: 05/01/2015
Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research

on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID - International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; NDSL – Non-Domestic Substance List (Canada); NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN NCI (Draft) - Vietnam National Chemicals Inventory (NCI) (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada) .

Other Information

Disclaimer:

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SAFETY DATA SHEET

Helium

Section 1. Identification

GHS product identifier : Helium

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

Product use : Synthetic/Analytical chemistry.

Synonym : helium (dot); Helium-4; He; o-Helium; UN 1046

SDS # : 001025

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

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Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

CAS number/other identifiers

CAS number : 7440-59-7

Product code : 001025

Ingredient name	%	CAS number
Helium	100	7440-59-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

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Section 4. First aid measures

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	Oxygen Depletion [Asphyxiant]

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

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Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Molecular weight : 4 g/mole

Molecular formula : He

Boiling/condensation point : -268.9°C (-452°F)

Melting/freezing point : -272.2°C (-458°F)

Critical temperature : -267.9°C (-450.2°F)

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Flash point : [Product does not sustain combustion.]

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : 0.14 (Air = 1) Liquid Density@BP: 7.8 lb/ft3 (125 kg/m3)

Specific Volume (ft ^{3}/lb) : 96.1538

Gas Density (lb/ft ^{3}) : 0.0104

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : 0.28

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

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Section 9. Physical and chemical properties

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

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Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

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Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Helium	0.28	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1046	UN1046	UN1046	UN1046	UN1046
UN proper shipping name	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 75 kg **Cargo aircraft** Quantity limitation: 150 kg	**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 75 kg **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

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Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Helium	100	No.	Yes.	No.	No.	No.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

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Section 15. Regulatory information

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: Not determined.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

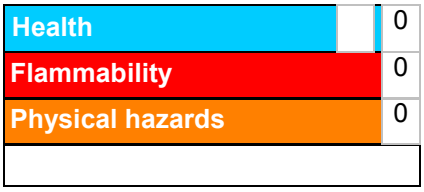
WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Section 16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 10/15/2014.

Date of issue/Date of revision : 10/15/2014.

Date of previous issue : 10/2/2014.

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Version 6.7
Revision Date 08/06/2024
Print Date 08/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Potassium hydrogen phthalate

Product Number : P1088
Brand : Sigma-Aldrich
CAS-No. : 877-24-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

No hazard pictogram, no signal word, no hazard statement(s), no precautionary statement(s) required.

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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	KHP Potassium biphthalate Potassium phthalate monobasic Phthalic acidmonopotassium salt Potassium hydrogen phthalate
Formula	:	$C_8H_5KO_4$
Molecular weight	:	204.22 g/mol
CAS-No.	:	877-24-7
EC-No.	:	212-889-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures
No data available

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media
No data available

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Potassium oxides
Combustible.

5.3 Advice for firefighters
No data available

5.4 Further information
No data available

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
For personal protection see section 8.

6.2 Environmental precautions
No data available

6.3 Methods and materials for containment and cleaning up
No data available

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
No data available

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Personal protective equipment

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please

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contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Control of environmental exposure
Prevent product from entering drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Crystalline solid Color: white
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	4 at 25 °C (77 °F)
e)	Melting point/freezing point	Melting point/ range: 295 - 300 °C (563 - 572 °F) - dec.
f)	Initial boiling point and boiling range	> 300 °C > 572 °F at 977.5 hPa - OECD Test Guideline 103
g)	Flash point	197.3 °C (387.1 °F) - Pensky-Martens closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable. - Regulation (EC) No. 440/2008, Annex, A.10
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	1.571 g/cm3 at 20 °C (68 °F)
	Relative density	No data available
n)	Water solubility	93 g/l at 30 °C (86 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	log Pow: <= -3.9 at 30 °C (86 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	does not ignite
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

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s) Explosive properties No data available

t) Oxidizing properties none

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
No data available

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents
Nitric acid

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 2,500 mg/kg
(Calculation method)
LD50 Oral - Rat - > 3,200 mg/kg
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: slight irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
Remarks: The value is given based on a SAR/AAR approach using OECD Toolbox, DEREK, VEGA QSAR models (CAESAR models), etc.
(ECHA)

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Respiratory or skin sensitization
In vitro study
Result: negative
(OECD Test Guideline 442D)

Germ cell mutagenicity
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: CZ4326000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Hazardous properties cannot be excluded but are unlikely when the product is handled appropriately.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Danio rerio (zebra fish) - > 100 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to algae	static test ErC50 - Desmodesmus subspicatus (green algae) - 329.5 mg/l - 72 h (OECD Test Guideline 201)

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Toxicity to bacteria	Remarks: (ECHA) (potassium hydrogen phthalate)

12.2 Persistence and degradability

Biodegradability	Result: 97.34 % - Readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

No data available

SECTION 14: Transport information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

Further information

Not classified as dangerous in the meaning of transport regulations.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 15: Regulatory information

CERCLA Reportable Quantity

This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

Version: 6.7 Revision Date: 08/06/2024 Print Date: 08/07/2024

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Safety Data Sheet

20ppm Hydrogen Sulfide, 60ppm Carbon Monoxide, 58% LEL Pentane Simulant, 15% VOL Oxygen; balance Nitrogen

Ideal Calibrations, LLC
2750 Oakwood Blvd.
Melvindale, MI 48122
(734) 956-0539
http://www.idealcalibrations.com/

Section 1: Product and Company Identification

Ideal Calibrations, LLC
2750 Oakwood Blvd.
Melvindale, MI 48122
(734) 956-0539
http://www.idealcalibrations.com/

Product Code: 20ppm Hydrogen Sulfide, 60ppm Carbon Monoxide, 58% LEL Pentane Simulant, 15% VOL Oxygen; balance Nitrogen
Part Number: 0219

Synonyms:
Recommended Use: Calibration of gas detection devices
Usage Restrictions: Do not use if current date is past expiration date on cylinder

Section 2: Hazards Identification



Warning

Hazard Classification:
Gases Under Pressure

Hazard Statements:
Contains gas under pressure; may explode if heated
Toxic to aquatic life

Precautionary Statements

Storage:
Protect from sunlight.
Store in well-ventilated place.

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Section 3: Composition/Information on Ingredients

	CAS #	Concentration
Hydrogen Sulfide	7783-06-4	0.002
Carbon Monoxide	630-08-0	0.006
Methane	74-82-8	1.45
Oxygen	7782-44-7	15
Nitrogen	7727-37-9	83.542

	Chemical Substance	Chemical Family	Trade Names
Hydrogen Sulfide	HYDROGEN SULFIDE	Inorganic gases	HYDROGEN SULFIDE (H2S); DIHYDROGEN MONOSULFIDE; DIHYDROGEN SULFIDE; HYDROSULFURIC ACID; SULFUR DIHYDRIDE; SULFURETED HYDROGEN; SULFUR HYDRIDE; STINK DAMP; SEWER GAS; RCRA U135; UN 1053; H2S
Carbon Monoxide	CARBON MONOXIDE	Inorganic gases	CARBON OXIDE; CARBON OXIDE (CO); UN 1016; CO
Methane	METHANE, COMPRESSED GAS	Hydrocarbons, Aliphatic, Saturated	FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH4
Oxygen	OXYGEN, COMPRESSED GAS	Inorganic gases	OXYGEN; DIOXYGEN; MOLECULAR OXYGEN; OXYGEN MOLECULE; PURE OXYGEN; UN 1072; O2
Nitrogen	NITROGEN, COMPRESSED GAS	Inorganic gases	DIATOMIC NITROGEN; DINITROGEN; NITROGEN; NITROGEN-14; NITROGEN GAS; UN 1066; N2

Section 4: First Aid Measures

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Hydrogen Sulfide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Carbon Monoxide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Methane	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Oxygen	None expected	None expected	Not likely route of exposure	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.	None

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	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Nitrogen	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.

Section 5: Fire Fighting Measures

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Hydrogen Sulfide	Let burn unless leak can be stopped immediately. Large fires: Use regular foam or flood with fine water spray.	Sulfur oxides	▪ Any self-contained breathing apparatus with a full facepiece. ▪ Protective material types: butyl rubber, polyvinyl chloride (PVC), neoprene
Carbon Monoxide	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon dioxide	▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. ▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Methane	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon monoxide, carbon dioxide, water	▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece. ▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
Oxygen	Non-flammable. Use extinguishing agent appropriate for the material which is burning. Use water in large quantities for fires involving oxygen.	Oxides of burning material	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ None
Nitrogen	Non-flammable. Use suitable extinguishing media for surrounding fire. Cylinders may rupture or explode if exposed to heat.	Non-flammable	▪ Respiratory protection may be needed for frequent or heavy exposure.

Section 6: Accidental Release Measures

	Personal Precautions	Environmental Precautions	Methods for Containment
Hydrogen Sulfide	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Ventilate closed spaces before entering. Evacuation radius: 150 feet. For tank, rail car or tank truck: 800 meters (1/2 mile). Do not touch spilled material.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Remove sources of ignition. Reduce vapors with water spray. Do not get water directly on material.
Carbon Monoxide	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition. Keep out of water supplies and sewers.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
Methane	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
Oxygen	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid contact with combustible materials.	Stop leak if possible without personal risk.
Nitrogen	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.	No significant effects from contamination expected.	Stop leak if possible without personal risk.

	Methods for Cleanup	Other Information

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	Methods for Cleanup	Other Information
Hydrogen Sulfide	Collect runoff for disposal as potential hazardous waste. Dike for later disposal. Absorb with sand or other non-combustible material. Add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash).	Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).
Carbon Monoxide	Stop leak, evacuate area. Wear protective equipment.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).
Methane	Not available	Not available
Oxygen	Stop leak and ventilate	None
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage
Hydrogen Sulfide	Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Store in a cool, dry place. Store in a well-ventilated area. Avoid contact with light. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355.30). Keep separated from incompatible substances.	Subject to handling regulations: U.S. OSHA 29 CFR 1910.119.
Carbon Monoxide	Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.
Methane	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Oxygen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Nitrogen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.

Section 8: Exposure Controls/Personal Protection

	Exposure Guidelines
Hydrogen Sulfide	HYDROGEN SULFIDE: 20 ppm OSHA ceiling 50 ppm OSHA peak 10 minute(s) (once if no other measurable exposure occurs) 10 ppm (14 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 15 ppm (21 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 10 ppm ACGIH TWA 15 ppm ACGIH STEL 10 ppm (15 mg/m3) NIOSH recommended ceiling 10 minute(s) TLV-TWA: 1ppm Upper respiratory irritation (ACGIH)
Carbon Monoxide	CARBON MONOXIDE: 50 ppm (55 mg/m3) OSHA TWA 35 ppm (40 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 200 ppm (229 mg/m3) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993) 25 ppm ACGIH TWA 35 ppm (40 mg/m3) NIOSH recommended TWA 10 hour(s) 200 ppm (229 mg/m3) NIOSH recommended ceiling
Methane	METHANE, COMPRESSED GAS: ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA METHANE: No occupational exposure limits established. ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA
Oxygen	OXYGEN, COMPRESSED GAS: No occupational exposure limits established.
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
Hydrogen Sulfide	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	Wear appropriate chemical resistant clothing.	Any self-contained breathing apparatus with a full facepiece.
Carbon Monoxide	Eye protection not required, but recommended.	Protective clothing is not required.	Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.

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	Eye Protection	Skin Protection	Respiratory Protection
Methane	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
Oxygen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.
Nitrogen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.

General Hygiene considerations

- Avoid breathing vapor or mist
- Avoid contact with eyes and skin
- Wash thoroughly after handling and before eating or drinking

Section 9: Physical and Chemical Properties

	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
Hydrogen Sulfide	Gas	Colorless	Colorless	N/A	Gas	Rotten egg odor	N/A
Carbon Monoxide	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Methane	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Oxygen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless
Nitrogen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
Hydrogen Sulfide	Flammable	Not available	Not available	500 F (260 C)	45.5%	3.9%
Carbon Monoxide	Flammable	Not available	1479.11 (log = 3.17) (estimated from water solubility)	1128-1202 F (609-650 C)	0.74	12.0-12.5%
Methane	-369 F (-223 C)	Not available	724.44 (log = 2.87) (estimated from water solubility)	999 F (537 C)	15%	5%
Oxygen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable
Nitrogen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable

	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
Hydrogen Sulfide	-78 to -77 F (-61 to -60.3 C)	-123 F (-86 C)	15200 mmHg @ 25 C	1.2 (Air=1)	1.192	2.58-2.9% @ 20 C	4.5-<7 (saturated solution)	0.13 ppm	Not applicable	0.0128 cP @ 25 C
Carbon Monoxide	-312.7 F (-191.5 C)	-326 F (-199 C)	760 mmHg @ -191 C gas; cannot be liquefied at room temperature	0.968 (Air=1)	Not applicable	2.3% @ 20 C	Not applicable	Not available	Not applicable	0.01657 cP @ 0 C
Methane	-260 F (-162 C)	-297 F (-183 C)	760 mmHg @ -161 C	0.555 (Air=1)	Not applicable	3.5% @ 17 C	Not applicable	Not available	Not applicable	0.01118 cP @ 27 C
Oxygen	-297 F (-183 C)	-360 F (-218 C)	760 mmHg @ -183 C	1.1 (Air=1)	Not applicable	3.2% @ 25 C	Not applicable	Not available	Not applicable	0.02075 cP @ 25 C
Nitrogen	-321 F (-196 C)	-346 F (-210 C)	760 mmHg @ -196 C	0.967 (Air=1)	Not applicable	1.6% @ 20 C	Not applicable	Not available	Not applicable	0.01787 cP @ 27 C

	Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility

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	Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
Hydrogen Sulfide	34.08	H2-S	1.539 g/L @ 0 C	Not available	Not available	Not applicable	Soluble: Carbon disulfide, alcohol, ether, glycerol, gasolines, kerosene, crude oil, alkali solutions
Carbon Monoxide	28.01	C-O	1.250 g/L @ 0 C	Not available	100%	Not applicable	Soluble: Alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions
Methane	16.04	C-H4	0.717 g/L @ 0 C	Not available	Not applicable	Not applicable	Soluble: Alcohol, ether, benzene, organic solvents
Oxygen	31.9988	O2	1.309 g/L @ 25 C	Not available	Not applicable	Not applicable	Soluble: Alcohol
Nitrogen	28.0134	N2	1.2506 g/L	Not available	100%	1	Soluble: Liquid ammonia

Section 10: Stability and Reactivity

	Stability	Conditions to Avoid	Incompatible Materials
Hydrogen Sulfide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, metals, oxidizing materials, halogens, metal oxides, metal salts, bases, rust, oxidants, oxygen, copper powder, acetaldehyde, silver fulminate
Carbon Monoxide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium
Methane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials, combustible materials
Oxygen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, halo carbons, metals, bases, reducing agents, amines, metal salts, oxidizing materials, alkaline earth and alkali metals
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Hydrogen Sulfide	Oxides of sulfur	Will not polymerize.
Carbon Monoxide	Oxides of carbon	Will not polymerize.
Methane	Oxides of carbon	Will not polymerize.
Oxygen	Miscellaneous decomposition products	Will not polymerize.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
Hydrogen Sulfide	444 ppm inhalation-rat LC50	Irritation 0.000125 ppm/5 hour(s) eyes-human	Irritation, lack of sense of smell, sensitivity to light, nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, disorientation, tremors, visual disturbances, suffocation, lung congestion, internal bleeding, heart damage, nerve damage, brain damage, coma, death
Carbon Monoxide	LC50 Inhalation Gas. Rat 1807 ppm 4 hours	Not available	Changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, suffocation, blood disorders, convulsions, coma
Methane	Not available	Not available	Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
Oxygen	Not established	Not established	Irritation, changes in body temperature, nausea, difficulty breathing, irregular heartbeat, dizziness, disorientation, hallucinations, mood swings, pain in extremities, tremors, lung congestion, convulsions
Nitrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

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	Eye Irritation	Skin Irritation	Sensitization
Hydrogen Sulfide	Irritation, sensitivity to light, visual disturbances	Irritation liquid: frostbite	Acute toxicity, Category 2, inhalation; H330: Fatal if inhaled. Specific Target Organ Toxicity (single exposure), Category 3; H335: May cause respiratory irritation. Hazardous to the aquatic environment, Acute Category 1; H400: Very toxic to aquatic life
Carbon Monoxide	No information on significant adverse effects	No information on significant adverse effects	Acute toxicity, Category 3, inhalation; H331: Toxic if inhaled. Reproductive toxicity, Category 1A; H360D: May damage the unborn child. Specific Target Organ Toxicity (repeated exposure), Category 1; H372: Causes damage to organs through prolonged or repeated exposure.
Methane	No information on significant adverse effects	No information on significant adverse effects	Difficulty breathing
Oxygen	No information on significant adverse effects	No information on significant adverse effects	No significant target effects reported.
Nitrogen	Contact with rapidly expanding gas may cause burns or frostbite	No information on significant adverse effects	Difficulty breathing

Chronic Effects

	Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
Hydrogen Sulfide	Not available	Not available	Available.	No data
Carbon Monoxide	Not available	Available.	Available.	No data
Methane	Not available	Not available	Not available	No data
Oxygen	Not known.	Available.	Available.	No data
Nitrogen	Not hazardous	Not available	Not available	No data

Section 12: Ecological Information

Fate and Transport

	Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
Hydrogen Sulfide	Fish toxicity: Acute LC50 7 ug/L Fresh water Fish - Fathead minnow - Pimephales promelas - FRY 96 hours; 14.9 ug/L 96 hour(s) LC50 (Mortality) Fathead minnow (Pimeph Invertibrate toxicity: 9730 ug/L 1.5 hour(s) (Mortality) Mediterranean mussel (Mytilus galloprovincialis) Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Highly toxic to aquatic life.	Not available	Not available
Carbon Monoxide	Fish toxicity: 75000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis) Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Highly volatile from water.	Not available	Not expected to leach through the soil or the sediment.
Methane	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Not expected to leach through the soil or the sediment.
Oxygen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Low bioaccumulation	Not available
Nitrogen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available

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Section 13: Disposal Considerations

Hydrogen Sulfide	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U135.
Carbon Monoxide	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Methane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Oxygen	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Nitrogen	Dispose in accordance with all applicable regulations.

Section 14: Transportation Information

U.S. DOT 49 CFR 172.101

DOT Information For This Mixture

Shipping Name	Compressed gas, n.o.s. (Nitrogen, Oxygen)
UN Number	UN1956
Hazard Class	2.2
Hazard Information	Non-Flammable Gas

Individual Component Information

	Proper Shipping Name	ID Number	Hazard Class or Division	Packing Group	Labeling Requirements	Passenger Aircraft or Railcar Quantity Limitations	Cargo Aircraft Only Quantity Limitations	Additional Shipping Description
Hydrogen Sulfide	Hydrogen sulfide	UN1053	2.3	Not applicable	2.3; 2.1	Forbidden	Forbidden	Toxic-Inhalation Hazard Zone B
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3	Not applicable	2.3; 2.1	Forbidden	25 kg	Toxic-Inhalation Hazard Zone D
Methane	Methane, compressed	UN1971	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
Oxygen	Oxygen, compressed	UN1072	2.2	Not available	2.2; 5.1	75 kg or L	150 kg	N/A
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable	2.2	75 kg or L	150 kg	N/A

Canadian Transportation of Dangerous Goods

	Shipping Name	UN Number	Class	Packing Group / Risk Group
Hydrogen Sulfide	HYDROGEN SULFIDE; or HYDROGEN SULPHIDE	UN1053	2.3; 2.1	Not applicable
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3; 2.1	Not applicable
Methane	Methane, compressed	UN1971	2.1	Not applicable
Oxygen	Oxygen, compressed	UN1072	2.2; 5.1	Not applicable
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable

Section 15: Regulatory Information

U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40
Hydrogen Sulfide	100 LBS RQ	500 LBS TPQ	100 LBS RQ
Carbon Monoxide	Not regulated.	Not regulated.	Not regulated.
Methane	Not regulated.	Not regulated.	Not regulated.
Oxygen	Not regulated.	Not regulated.	Not regulated.

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Nitrogen	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Hydrogen Sulfide	Yes	No	Yes	No	Yes
Carbon Monoxide	Yes	No	Yes	No	Yes
Methane	Yes	No	Yes	No	Yes
Oxygen	No	No	Yes	No	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

Hydrogen Sulfide	HYDROGEN SULFIDE: Administrative stay issued Aug. 22, 1994
Carbon Monoxide	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

OSHA Process Safety

Hydrogen Sulfide	1500 LBS TQ
Carbon Monoxide	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
Hydrogen Sulfide	Not regulated.
Carbon Monoxide	WARNING: This product can expose you to chemicals including Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.
Methane	Not regulated.
Oxygen	Not regulated.
Nitrogen	Not regulated.

Canadian Regulations

	WHMIS Classification
Hydrogen Sulfide	A, B1, D1A, D2B.
Carbon Monoxide	A, B1, D1A, D2A.
Methane	A, B1
Oxygen	A,C
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
Hydrogen Sulfide	Listed on inventory.	Not listed.	Listed on inventory.
Carbon Monoxide	Listed on inventory.	Not listed.	Listed on inventory.
Methane	Listed on inventory.	Not listed.	Listed on inventory.
Oxygen	Listed on inventory.	Not listed.	Not determined.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

Section 16: Other Information

	NFPA Rating
Hydrogen Sulfide	HEALTH=4 FIRE=4 REACTIVITY=0
Carbon Monoxide	HEALTH=2 FIRE=4 REACTIVITY=0
Methane	HEALTH=0 FIRE=4 REACTIVITY=0
Oxygen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=OX
Nitrogen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

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Safety Data Sheet

20ppm Hydrogen Sulfide, 60ppm Carbon Monoxide, 58% LEL Pentane Simulant, 15.0% VOL Oxygen, 2.5% VOL Carbon Dioxide; balance Nitrogen

Ideal Calibrations, LLC
2750 Oakwood Blvd.
Melvindale, MI 48122
(734) 956-0539
http://www.idealcalibrations.com/

Section 1: Product and Company Identification

Ideal Calibrations, LLC
2750 Oakwood Blvd.
Melvindale, MI 48122
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Product Code: 20ppm Hydrogen Sulfide, 60ppm Carbon Monoxide, 58% LEL Pentane Simulant, 15.0% VOL Oxygen, 2.5% VOL Carbon Dioxide; balance Nitrogen
Part Number: 0522

Synonyms:
Recommended Use: Calibration of gas detection devices
Usage Restrictions: Do not use if current date is past expiration date on cylinder

Section 2: Hazards Identification



Warning

Hazard Classification:
Gases Under Pressure

Hazard Statements:
Contains gas under pressure; may explode if heated
Toxic to aquatic life

Precautionary Statements

Storage:
Protect from sunlight.
Store in well-ventilated place.

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Section 3: Composition/Information on Ingredients

	CAS #	Concentration
Hydrogen Sulfide	7783-06-4	0.002
Carbon Monoxide	630-08-0	0.006
Methane	74-82-8	1.45
Oxygen	7782-44-7	15
Carbon Dioxide	124-38-9	2.5
Nitrogen	7727-37-9	81.042

	Chemical Substance	Chemical Family	Trade Names
Hydrogen Sulfide	HYDROGEN SULFIDE	Inorganic gases	HYDROGEN SULFIDE (H2S); DIHYDROGEN MONOSULFIDE; DIHYDROGEN SULFIDE; HYDROSULFURIC ACID; SULFUR DIHYDRIDE; SULFURETED HYDROGEN; SULFUR HYDRIDE; STINK DAMP; SEWER GAS; RCRA U135; UN 1053; H2S
Carbon Monoxide	CARBON MONOXIDE	Inorganic gases	CARBON OXIDE; CARBON OXIDE (CO); UN 1016; CO
Methane	METHANE, COMPRESSED GAS	Hydrocarbons, Aliphatic, Saturated	FIRE DAMP; MARSH GAS; METHYL HYDRIDE; NATURAL GAS; METHANE; UN 1971; R50; CH4
Oxygen	OXYGEN, COMPRESSED GAS	Inorganic gases	OXYGEN; DIOXYGEN; MOLECULAR OXYGEN; OXYGEN MOLECULE; PURE OXYGEN; UN 1072; O2
Carbon Dioxide	CARBON DIOXIDE, GAS	Inorganic gases	CARBONIC ACID GAS; CARBONIC ANHYDRIDE; CARBON DIOXIDE; CARBON OXIDE; UN 1013; CO2
Nitrogen	NITROGEN, COMPRESSED GAS	Inorganic gases	DIATOMIC NITROGEN; DINITROGEN; NITROGEN; NITROGEN-14; NITROGEN GAS; UN 1066; N2

Section 4: First Aid Measures

	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Hydrogen Sulfide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Carbon Monoxide	Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.	Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Methane	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.

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	Skin Contact	Eye Contact	Ingestion	Inhalation	Note to Physicians
Oxygen	None expected	None expected	Not likely route of exposure	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. Get immediate medical attention.	None
Carbon Dioxide	If frostbite or freezing occur, immediately flush with plenty of lukewarm water (105-115 F; 41-46 C). DO NOT USE HOT WATER. If warm water is not available, gently wrap affected parts in blankets. Get immediate medical attention.	Contact with liquid: Immediately flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.	Do not induce vomiting.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.
Nitrogen	Wash exposed skin with soap and water.	Flush eyes with plenty of water.	If a large amount is swallowed, get medical attention.	If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.	For inhalation, consider oxygen.

Section 5: Fire Fighting Measures

	Suitable Extinguishing Media	Products of Combustion	Protection of Firefighters
Hydrogen Sulfide	Let burn unless leak can be stopped immediately. Large fires: Use regular foam or flood with fine water spray.	Sulfur oxides	▪ Any self-contained breathing apparatus with a full facepiece. ▪ Protective material types: butyl rubber, polyvinyl chloride (PVC), neoprene
Carbon Monoxide	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon dioxide	▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply. ▪ Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Methane	Carbon dioxide, regular dry chemical Large fires: Use regular foam or flood with fine water spray.	Carbon monoxide, carbon dioxide, water	▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece. ▪ Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
Oxygen	Non-flammable. Use extinguishing agent appropriate for the material which is burning. Use water in large quantities for fires involving oxygen.	Oxides of burning material	▪ Respiratory protection may be needed for frequent or heavy exposure. ▪ None
Carbon Dioxide	Non-flammable	Non-flammable	▪ Any appropriate escape-type, self-contained breathing apparatus. ▪ Non-flammable
Nitrogen	Non-flammable. Use suitable extinguishing media for surrounding fire. Cylinders may rupture or explode if exposed to heat.	Non-flammable	▪ Respiratory protection may be needed for frequent or heavy exposure.

Section 6: Accidental Release Measures

	Personal Precautions	Environmental Precautions	Methods for Containment

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	Personal Precautions	Environmental Precautions	Methods for Containment
Hydrogen Sulfide	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas. Ventilate closed spaces before entering. Evacuation radius: 150 feet. For tank, rail car or tank truck: 800 meters (1/2 mile). Do not touch spilled material.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Remove sources of ignition. Reduce vapors with water spray. Do not get water directly on material.
Carbon Monoxide	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition. Keep out of water supplies and sewers.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
Methane	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid heat, flames, sparks and other sources of ignition.	Stop leak if possible without personal risk. Reduce vapors with water spray. Remove sources of ignition.
Oxygen	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering.	Avoid contact with combustible materials.	Stop leak if possible without personal risk.
Carbon Dioxide	Keep unnecessary people away, isolate hazard area and deny entry. Ventilate closed spaces before entering. Do not touch spilled material.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65). Keep out of water supplies and sewers.	Stop leak if possible without personal risk.
Nitrogen	Keep unnecessary people away, isolate hazard area and deny entry. Stay upwind and keep out of low areas.	No significant effects from contamination expected.	Stop leak if possible without personal risk.

	Methods for Cleanup	Other Information
Hydrogen Sulfide	Collect runoff for disposal as potential hazardous waste. Dike for later disposal. Absorb with sand or other non-combustible material. Add an alkaline material (lime, crushed limestone, sodium bicarbonate, or soda ash).	Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).
Carbon Monoxide	Stop leak, evacuate area. Wear protective equipment.	Subject to California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65).
Methane	Not available	Not available
Oxygen	Stop leak and ventilate	None
Carbon Dioxide	Stop leak, evacuate, remove source of ignition.	None
Nitrogen	N/A	N/A

Section 7: Handling and Storage

	Handling	Storage
Hydrogen Sulfide	Store and handle in accordance with all current regulations and standards. Protect from physical damage. Store outside or in a detached building. Store in a cool, dry place. Store in a well-ventilated area. Avoid contact with light. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Notify State Emergency Response Commission for storage or use at amounts greater than or equal to the TPQ (U.S. EPA SARA Section 302). SARA Section 303 requires facilities storing a material with a TPQ to participate in local emergency response planning (U.S. EPA 40 CFR 355.30). Keep separated from incompatible substances.	Subject to handling regulations: U.S. OSHA 29 CFR 1910.119.
Carbon Monoxide	Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.
Methane	Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Oxygen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.
Carbon Dioxide	Subject to storage regulations: U.S. OSHA 29 CFR 1910.101. Keep separated from incompatible substances.	Store and handle in accordance with all current regulations and standards
Nitrogen	Store and handle in accordance with all current regulations and standards. Subject to storage regulations: U.S. OSHA 29 CFR 1910.101.	Keep separated from incompatible substances.

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Section 8: Exposure Controls/Personal Protection

	Exposure Guidelines
Hydrogen Sulfide	HYDROGEN SULFIDE: 20 ppm OSHA ceiling 50 ppm OSHA peak 10 minute(s) (once if no other measurable exposure occurs) 10 ppm (14 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 15 ppm (21 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 10 ppm ACGIH TWA 15 ppm ACGIH STEL 10 ppm (15 mg/m3) NIOSH recommended ceiling 10 minute(s) TLV-TWA: 1ppm Upper respiratory irritation (ACGIH)
Carbon Monoxide	CARBON MONOXIDE: 50 ppm (55 mg/m3) OSHA TWA 35 ppm (40 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 200 ppm (229 mg/m3) OSHA ceiling (vacated by 58 FR 35338, June 30, 1993) 25 ppm ACGIH TWA 35 ppm (40 mg/m3) NIOSH recommended TWA 10 hour(s) 200 ppm (229 mg/m3) NIOSH recommended ceiling
Methane	METHANE, COMPRESSED GAS: ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA METHANE: No occupational exposure limits established. ALIPHATIC HYDROCARBON GASES ALKANE (C1-C4): 1000 ppm ACGIH TWA
Oxygen	OXYGEN, COMPRESSED GAS: No occupational exposure limits established.
Carbon Dioxide	CARBON DIOXIDE, GAS: CARBON DIOXIDE: 5000 ppm (9000 mg/m3) OSHA TWA 10000 ppm (18000 mg/m3) OSHA TWA (vacated by 58 FR 35338, June 30, 1993) 30000 ppm (54000 mg/m3) OSHA STEL (vacated by 58 FR 35338, June 30, 1993) 5000 ppm ACGIH TWA 30000 ppm ACGIH STEL 5000 ppm (9000 mg/m3) NIOSH recommended TWA 10 hour(s) 30000 ppm (54000 mg/m3) NIOSH recommended STEL
Nitrogen	NITROGEN, COMPRESSED GAS: NITROGEN: ACGIH (simple asphyxiant)

Engineering Controls

Handle only in fully enclosed systems.

	Eye Protection	Skin Protection	Respiratory Protection
Hydrogen Sulfide	Wear splash resistant safety goggles with a face shield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	Wear appropriate chemical resistant clothing.	Any self-contained breathing apparatus with a full facepiece.
Carbon Monoxide	Eye protection not required, but recommended.	Protective clothing is not required.	Any supplied-air respirator with full facepiece and operated in a pressure-demand or other positive-pressure mode in combination with a separate escape supply.
Methane	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure. Any self-contained breathing apparatus with a full facepiece.
Oxygen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.
Carbon Dioxide	For the gas: Eye protection not required, but recommended. For the liquid: Wear splash resistant safety goggles. Contact lenses should not be worn. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.	For the gas: Protective clothing is not required. For the liquid: Wear appropriate protective, cold insulating clothing.	Any appropriate escape-type, self-contained breathing apparatus.
Nitrogen	Eye protection not required, but recommended.	Protective clothing is not required.	Respiratory protection may be needed for frequent or heavy exposure.

General Hygiene considerations

- Avoid breathing vapor or mist
- Avoid contact with eyes and skin
- Wash thoroughly after handling and before eating or drinking

Section 9: Physical and Chemical Properties

	Physical State	Appearance	Color	Change in Appearance	Physical Form	Odor	Taste
Hydrogen Sulfide	Gas	Colorless	Colorless	N/A	Gas	Rotten egg odor	N/A
Carbon Monoxide	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Methane	Gas	Colorless	Colorless	N/A	Gas	Odorless	Tasteless
Oxygen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless
Carbon Dioxide	Gas	Colorless	Colorless	N/A	Gas	Odorless	Acid taste
Nitrogen	Gas	Clear	Colorless	N/A	Gas	Odorless	Tasteless

	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits

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	Flash Point	Flammability	Partition Coefficient	Autoignition Temperature	Upper Explosive Limits	Lower Explosive Limits
Hydrogen Sulfide	Flammable	Not available	Not available	500 F (260 C)	45.5%	3.9%
Carbon Monoxide	Flammable	Not available	1479.11 (log = 3.17) (estimated from water solubility)	1128-1202 F (609-650 C)	0.74	12.0-12.5%
Methane	-369 F (-223 C)	Not available	724.44 (log = 2.87) (estimated from water solubility)	999 F (537 C)	15%	5%
Oxygen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable
Carbon Dioxide	Not flammable	Not available	N/A	Nonflammable	Nonflammable	Nonflammable
Nitrogen	Not flammable	Not available	Not available	Nonflammable	Nonflammable	Nonflammable

	Boiling Point	Freezing Point	Vapor Pressure	Vapor Density	Specific Gravity	Water Solubility	pH	Odor Threshold	Evaporation Rate	Viscosity
Hydrogen Sulfide	-78 to -77 F (-61 to -60.3 C)	-123 F (-86 C)	15200 mmHg @ 25 C	1.2 (Air=1)	1.192	2.58-2.9% @ 20 C	4.5-<7 (saturated solution)	0.13 ppm	Not applicable	0.0128 cP @ 25 C
Carbon Monoxide	-312.7 F (-191.5 C)	-326 F (-199 C)	760 mmHg @ -191 C gas; cannot be liquefied at room temperature	0.968 (Air=1)	Not applicable	2.3% @ 20 C	Not applicable	Not available	Not applicable	0.01657 cP @ 0 C
Methane	-260 F (-162 C)	-297 F (-183 C)	760 mmHg @ -161 C	0.555 (Air=1)	Not applicable	3.5% @ 17 C	Not applicable	Not available	Not applicable	0.01118 cP @ 27 C
Oxygen	-297 F (-183 C)	-360 F (-218 C)	760 mmHg @ -183 C	1.1 (Air=1)	Not applicable	3.2% @ 25 C	Not applicable	Not available	Not applicable	0.02075 cP @ 25 C
Carbon Dioxide	Not available	-71 F (-57 C) @ 4000 mmHg	43700 mmHg @ 21 C	1.5 (Air=1)	1.522 @ 21 C	Soluble	3.7 (saturated aqueous solution) @ 101.3 kPa (carbonic acid)	Not available	Not applicable	0.01657 cP @ 0 C
Nitrogen	-321 F (-196 C)	-346 F (-210 C)	760 mmHg @ -196 C	0.967 (Air=1)	Not applicable	1.6% @ 20 C	Not applicable	Not available	Not applicable	0.01787 cP @ 27 C

	Molecular Weight	Molecular Formula	Density	Weight per Gallon	Volatility by Volume	Volatility	Solvent Solubility
Hydrogen Sulfide	34.08	H2-S	1.539 g/L @ 0 C	Not available	Not available	Not applicable	Soluble: Carbon disulfide, alcohol, ether, glycerol, gasolines, kerosene, crude oil, alkali solutions
Carbon Monoxide	28.01	C-O	1.250 g/L @ 0 C	Not available	100%	Not applicable	Soluble: Alcohol, benzene, acetic acid, ethyl acetate, chloroform, cuprous chloride solutions
Methane	16.04	C-H4	0.717 g/L @ 0 C	Not available	Not applicable	Not applicable	Soluble: Alcohol, ether, benzene, organic solvents
Oxygen	31.9988	O2	1.309 g/L @ 25 C	Not available	Not applicable	Not applicable	Soluble: Alcohol
Carbon Dioxide	44.01	C-O2	0.114	Not available	Not applicable	Not applicable	Soluble: Alcohol, acetone, hydrocarbons, organic solvents
Nitrogen	28.0134	N2	1.2506 g/L	Not available	100%	1	Soluble: Liquid ammonia

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Section 10: Stability and Reactivity

	Stability	Conditions to Avoid	Incompatible Materials
Hydrogen Sulfide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, metals, oxidizing materials, halogens, metal oxides, metal salts, bases, rust, oxidants, oxygen, copper powder, acetaldehyde, silver fulminate
Carbon Monoxide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Oxidizing materials, halogens, metal oxides, metals, combustible materials, lithium
Methane	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Halogens, oxidizing materials, combustible materials
Oxygen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, halo carbons, metals, bases, reducing agents, amines, metal salts, oxidizing materials, alkaline earth and alkali metals
Carbon Dioxide	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Combustible materials, oxidizing materials, metal salts, reducing agents, metal carbide, metals, bases
Nitrogen	Stable at normal temperatures and pressure.	Stable at normal temperatures and pressure.	Metals, oxidizing materials

	Hazardous Decomposition Products	Possibility of Hazardous Reactions
Hydrogen Sulfide	Oxides of sulfur	Will not polymerize.
Carbon Monoxide	Oxides of carbon	Will not polymerize.
Methane	Oxides of carbon	Will not polymerize.
Oxygen	Miscellaneous decomposition products	Will not polymerize.
Carbon Dioxide	Carbon monoxide	Will not polymerize.
Nitrogen	Oxides of nitrogen	Will not polymerize.

Section 11: Toxicology Information

Acute Effects

	Oral LD50	Dermal LD50	Inhalation
Hydrogen Sulfide	444 ppm inhalation-rat LC50	Irritation 0.000125 ppm/5 hour(s) eyes-human	Irritation, lack of sense of smell, sensitivity to light, nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, disorientation, tremors, visual disturbances, suffocation, lung congestion, internal bleeding, heart damage, nerve damage, brain damage, coma, death
Carbon Monoxide	LC50 Inhalation Gas. Rat 1807 ppm 4 hours	Not available	Changes in body temperature, changes in blood pressure, nausea, vomiting, chest pain, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, disorientation, hallucinations, pain in extremities, tremors, loss of coordination, hearing loss, visual disturbances, eye damage, suffocation, blood disorders, convulsions, coma
Methane	Not available	Not available	Nausea, vomiting, difficulty breathing, irregular heartbeat, headache, drowsiness, fatigue, dizziness, disorientation, mood swings, tingling sensation, loss of coordination, suffocation, convulsions, unconsciousness, coma
Oxygen	Not established	Not established	Irritation, changes in body temperature, nausea, difficulty breathing, irregular heartbeat, dizziness, disorientation, hallucinations, mood swings, pain in extremities, tremors, lung congestion, convulsions
Carbon Dioxide	Not established	Not established	Ringing in the ears, nausea, irregular heartbeat, headache, drowsiness, dizziness, tingling sensation, visual disturbances, suffocation, convulsions, coma
Nitrogen	Not available	Not available	Nausea, vomiting, difficulty breathing, headache, drowsiness, dizziness, tingling sensation, loss of coordination, convulsions, coma

	Eye Irritation	Skin Irritation	Sensitization
Hydrogen Sulfide	Irritation, sensitivity to light, visual disturbances	Irritation liquid: frostbite	Acute toxicity, Category 2, inhalation; H330: Fatal if inhaled. Specific Target Organ Toxicity (single exposure), Category 3; H335: May cause respiratory irritation. Hazardous to the aquatic environment, Acute Category 1; H400: Very toxic to aquatic life
Carbon Monoxide	No information on significant adverse effects	No information on significant adverse effects	Acute toxicity, Category 3, inhalation; H331: Toxic if inhaled. Reproductive toxicity, Category 1A; H360D: May damage the unborn child. Specific Target Organ Toxicity (repeated exposure), Category 1; H372: Causes damage to organs through prolonged or repeated exposure.

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	Eye Irritation	Skin Irritation	Sensitization
Methane	No information on significant adverse effects	No information on significant adverse effects	Difficulty breathing
Oxygen	No information on significant adverse effects	No information on significant adverse effects	No significant target effects reported.
Carbon Dioxide	Irritation, frostbite, blurred vision	Liquid: blisters, frostbite	Difficulty breathing
Nitrogen	Contact with rapidly expanding gas may cause burns or frostbite	No information on significant adverse effects	Difficulty breathing

Chronic Effects

	Carcinogenicity	Mutagenicity	Reproductive Effects	Developmental Effects
Hydrogen Sulfide	Not available	Not available	Available.	No data
Carbon Monoxide	Not available	Available.	Available.	No data
Methane	Not available	Not available	Not available	No data
Oxygen	Not known.	Available.	Available.	No data
Carbon Dioxide	Not available	Not established	Available.	No data
Nitrogen	Not hazardous	Not available	Not available	No data

Section 12: Ecological Information

Fate and Transport

	Eco toxicity	Persistence / Degradability	Bioaccumulation / Accumulation	Mobility in Environment
Hydrogen Sulfide	Fish toxicity: Acute LC50 7 ug/L Fresh water Fish - Fathead minnow - Pimephales promelas - FRY 96 hours; 14.9 ug/L 96 hour(s) LC50 (Mortality) Fathead minnow (Pimeph Invertibrate toxicity: 9730 ug/L 1.5 hour(s) (Mortality) Mediterranean mussel (Mytilus galloprovincialis) Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Highly toxic to aquatic life.	Not available	Not available
Carbon Monoxide	Fish toxicity: 75000 ug/L 1 day(s) LC100 (Mortality) Orangespotted sunfish (Lepomis humilis) Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Highly volatile from water.	Not available	Not expected to leach through the soil or the sediment.
Methane	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Not expected to leach through the soil or the sediment.
Oxygen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Low bioaccumulation	Not available
Carbon Dioxide	Fish toxicity: 150000 ug/L 48 day(s) (Mortality) Brown trout (Salmo trutta) Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Relatively non-persistent in the environment. Moderately volatile from water.	Accumulates very little in the bodies of living organisms.	Leaches through the soil
Nitrogen	Fish toxicity: Not available Invertibrate toxicity: Not available Algal toxicity: Not available Phyto toxicity: Not available Other toxicity: Not available	Not available	Not available	Not available

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Section 13: Disposal Considerations

Hydrogen Sulfide	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): U135.
Carbon Monoxide	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Methane	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Oxygen	Dispose in accordance with all applicable regulations. Subject to disposal regulations: U.S. EPA 40 CFR 262. Hazardous Waste Number(s): D001.
Carbon Dioxide	Dispose in accordance with all applicable regulations.
Nitrogen	Dispose in accordance with all applicable regulations.

Section 14: Transportation Information

U.S. DOT 49 CFR 172.101

DOT Information For This Mixture

Shipping Name	Compressed gas, n.o.s. (Nitrogen, Oxygen)
UN Number	UN1956
Hazard Class	2.2
Hazard Information	Non-Flammable Gas

Individual Component Information

	Proper Shipping Name	ID Number	Hazard Class or Division	Packing Group	Labeling Requirements	Passenger Aircraft or Railcar Quantity Limitations	Cargo Aircraft Only Quantity Limitations	Additional Shipping Description
Hydrogen Sulfide	Hydrogen sulfide	UN1053	2.3	Not applicable	2.3; 2.1	Forbidden	Forbidden	Toxic-Inhalation Hazard Zone B
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3	Not applicable	2.3; 2.1	Forbidden	25 kg	Toxic-Inhalation Hazard Zone D
Methane	Methane, compressed	UN1971	2.1	Not applicable	2.1	Forbidden	150 kg	N/A
Oxygen	Oxygen, compressed	UN1072	2.2	Not available	2.2; 5.1	75 kg or L	150 kg	N/A
Carbon Dioxide	Carbon dioxide	UN1013	2.2	Not applicable	2.2	75 kg or L	150kg	None
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable	2.2	75 kg or L	150 kg	N/A

Canadian Transportation of Dangerous Goods

	Shipping Name	UN Number	Class	Packing Group / Risk Group
Hydrogen Sulfide	HYDROGEN SULFIDE; or HYDROGEN SULPHIDE	UN1053	2.3; 2.1	Not applicable
Carbon Monoxide	Carbon monoxide, compressed	UN1016	2.3; 2.1	Not applicable
Methane	Methane, compressed	UN1971	2.1	Not applicable
Oxygen	Oxygen, compressed	UN1072	2.2; 5.1	Not applicable
Carbon Dioxide	Carbon dioxide	UN1013	2.2	Not applicable
Nitrogen	Nitrogen, compressed	UN1066	2.2	Not applicable

Section 15: Regulatory Information

U.S. Regulations

	CERCLA Sections	SARA 355.30	SARA 355.40

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Hydrogen Sulfide	100 LBS RQ	500 LBS TPQ	100 LBS RQ
Carbon Monoxide	Not regulated.	Not regulated.	Not regulated.
Methane	Not regulated.	Not regulated.	Not regulated.
Oxygen	Not regulated.	Not regulated.	Not regulated.
Carbon Dioxide	Not regulated.	Not regulated.	Not regulated.
Nitrogen	Not regulated.	Not regulated.	Not regulated.

SARA 370.21

	Acute	Chronic	Fire	Reactive	Sudden Release
Hydrogen Sulfide	Yes	No	Yes	No	Yes
Carbon Monoxide	Yes	No	Yes	No	Yes
Methane	Yes	No	Yes	No	Yes
Oxygen	No	No	Yes	No	Yes
Carbon Dioxide	Yes	No	No	No	Yes
Nitrogen	Yes	No	No	No	Yes

SARA 372.65

Hydrogen Sulfide	HYDROGEN SULFIDE: Administrative stay issued Aug. 22, 1994
Carbon Monoxide	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Carbon Dioxide	Not regulated.
Nitrogen	Not regulated.

OSHA Process Safety

Hydrogen Sulfide	1500 LBS TQ
Carbon Monoxide	Not regulated.
Methane	Not regulated.
Oxygen	Not regulated.
Carbon Dioxide	Not regulated.
Nitrogen	Not regulated.

State Regulations

	CA Proposition 65
Hydrogen Sulfide	Not regulated.
Carbon Monoxide	WARNING: This product can expose you to chemicals including Carbon Monoxide, which is known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.
Methane	Not regulated.
Oxygen	Not regulated.
Carbon Dioxide	Not regulated.
Nitrogen	Not regulated.

Canadian Regulations

	WHMIS Classification
Hydrogen Sulfide	A, B1, D1A, D2B.
Carbon Monoxide	A, B1, D1A, D2A.
Methane	A, B1
Oxygen	A,C
Carbon Dioxide	A
Nitrogen	A

National Inventory Status

	US Inventory (TSCA)	TSCA 12b Export Notification	Canada Inventory (DSL/NDSL)
Hydrogen Sulfide	Listed on inventory.	Not listed.	Listed on inventory.
Carbon Monoxide	Listed on inventory.	Not listed.	Listed on inventory.
Methane	Listed on inventory.	Not listed.	Listed on inventory.
Oxygen	Listed on inventory.	Not listed.	Not determined.
Carbon Dioxide	Listed on inventory.	Not listed.	Listed on inventory.
Nitrogen	Listed on inventory.	Not listed.	Listed on inventory.

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Section 16: Other Information

	NFPA Rating
Hydrogen Sulfide	HEALTH=4 FIRE=4 REACTIVITY=0
Carbon Monoxide	HEALTH=2 FIRE=4 REACTIVITY=0
Methane	HEALTH=0 FIRE=4 REACTIVITY=0
Oxygen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=OX
Carbon Dioxide	HEALTH=3 FIRE=0 REACTIVITY=0 SPECIAL=SA
Nitrogen	HEALTH=0 FIRE=0 REACTIVITY=0 SPECIAL=SA

0 = minimal hazard, 1 = slight hazard, 2 = moderate hazard, 3 = severe hazard, 4 = extreme hazard

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SAFETY DATA SHEET

Creation Date 30-Oct-2009 **Revision Date** 24-Dec-2021 **Revision Number** 4

1. Identification

Product Name **Potassium hydrogen phthalate**

Cat No. : **AC177120000; AC177120025; AC177120050; AC177121000; AC177125000**

CAS No 877-24-7
Synonyms Potassium acid phthalate; Potassium biphthalate

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company
Fisher Scientific Company
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

This chemical is not considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
None identified

3. Composition/Information on Ingredients

Component	CAS No	Weight %
1,2-Benzenedicarboxylic acid, monopotassium salt	877-24-7	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention if irritation persists.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention immediately if symptoms occur.

Inhalation Remove to fresh air. Get medical attention immediately if symptoms occur. If not breathing, give artificial respiration.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray, carbon dioxide (CO2), dry chemical, alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition. Thermal decomposition can lead to release of irritating gases and vapors.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2).
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment as required. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional Ecological Information.

Methods for Containment and Clean Up Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

7. Handling and storage

Handling Wear personal protective equipment/face protection. Ensure adequate ventilation. Avoid contact with skin, eyes or clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage. Keep containers tightly closed in a dry, cool and well-ventilated place. Incompatible Materials. Strong oxidizing agents.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limitsestablished by the region specific regulatory bodies.

Engineering Measures None under normal use conditions.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection No protective equipment is needed under normal use conditions.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	White
Odor	Odorless
Odor Threshold	No information available
pH	3.8-4.0 5% aq.sol
Melting Point/Range	295 - 300 °C / 563 - 572 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	Not applicable
Specific Gravity	No information available
Solubility	Slightly soluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C8 H5 K O4
Molecular Weight	204.22

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
1,2-Benzenedicarboxylic acid, monopotassium salt	LD50 > 3200 mg/kg (Rat)	>1000 mg/kg	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS No	IARC	NTP	ACGIH	OSHA	Mexico
1,2-Benzenedicarboxylic acid, monopotassium salt	877-24-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity

Do not empty into drains.

Persistence and Degradability Soluble in water Persistence is unlikely based on information available.

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its water solubility.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA Not regulated
IMDG/IMO Not regulated

15. Regulatory information

United States of America Inventory

Component	CAS No	TSCA	TSCA Inventory notification - Active-Inactive	TSCA - EPA Regulatory Flags
1,2-Benzenedicarboxylic acid, monopotassium salt	877-24-7	X	ACTIVE	-

Legend:
TSCA US EPA (TSCA) - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Japan (ISHL), Australia (AICS), China (IECSC), Korea (KECL).

Component	CAS No	DSL	NDSL	EINECS	PICCS	ENCS	ISHL	AICS	IECSC	KECL
1,2-Benzenedicarboxylic acid, monopotassium salt	877-24-7	X	-	212-889-4	X	X	X	X	X	KE-02310

KECL - NIER number or KE number (http://ncis.nier.go.kr/en/main.do)

U.S. Federal Regulations

SARA 313 Not applicable

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act) Not applicable

Clean Air Act Not applicable

OSHA - Occupational Safety and Health Administration Not applicable

CERCLA Not applicable

California Proposition 65 This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations Not applicable

U.S. Department of Transportation
Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Authorisation/Restrictions according to EU REACH

Safety, health and environmental regulations/legislation specific for the substance or mixture

Component	CAS No	OECD HPV	Persistent Organic Pollutant	Ozone Depletion Potential	Restriction of Hazardous Substances (RoHS)
1,2-Benzenedicarboxylic acid, monopotassium salt	877-24-7	Not applicable	Not applicable	Not applicable	Not applicable

Component	CAS No	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Major Accident Notification	Seveso III Directive (2012/18/EC) - Qualifying Quantities for Safety Report Requirements	Rotterdam Convention (PIC)	Basel Convention (Hazardous Waste)
1,2-Benzenedicarboxylic acid, monopotassium salt	877-24-7	Not applicable	Not applicable	Not applicable	Not applicable

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 30-Oct-2009
Revision Date 24-Dec-2021
Print Date 24-Dec-2021
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

HORIBA

SAFETY DATA SHEET

Section 1. Product and Company Identification

Product Name: 525-4, 500-4, 560-4 (pH 4.01 buffer solution)

Product code: 3999960018, 3999960029, 3999960146

Recommended use: For laboratory and Industrial use

Manufacturer / Supplier: Horiba Instruments (Singapore) Pte Ltd
83 Science Park Drive, #02-02A, The Curie
Singapore-118258
Contact No: +65 69089600

Section 2. Hazard identification

Classification of the Substance or Mixture: Mixture

The mixture is classified as not hazardous according to regulation (EC) 1272/2008, Globally Harmonized System (GHS)

GHS Label elements:

Signal word: No Signal word
Hazard statement: No Known significant effects or critical hazards

Precautionary statements:
General: Do not handle until all safety precautions have been read and understood

Other hazards which do not result in classification: None known

Section 3. Composition/ information on ingredients

Substance or Mixture: Mixture

CAS Numbers other identifiers:

Ingredients	CAS Number	Percentage
Potassium Hydrogen Phthalate	877-24-7	<2%
Water	7732-18-5	>98%

This product contains <0.01% other ingredient, not required to be listed as it is not hazardous to health and environment.

The exact percentage of composition has been withheld as a trade secret

Chemical formula: Not applicable

Section 4. First Aid Measures

Description of necessary first aid measures

Eye contact:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Remove any contact lenses. Get medical attention if irritation occurs.
Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact:	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion:	Clean mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, both acute and delayed

Potential acute health effects: No known significant effects or critical hazards

Over-exposure signs/symptoms: No specific data available

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See toxicological information (Section 11)

Section 5. Firefighting Measures

Extinguishing Media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing Media: No Information available

Specific hazards arising from the substance or mixture: No specific information available

Hazardous thermal decomposition products: No Specific data

Special protective actions for Fire-fighters: Promptly isolate the scene by removing all persons from the incident if there is fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus with a full face-piece operated in positive pressure mode.

Section 6. Accidental release Measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel"

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, water ways, soil and air

Methods and material for containment and cleaning up:

Method for Containment: Prevent further leakage or spillage if safe to do so.

Methods of cleaning up: Soak up with inert absorbent material. Pick up and transfer to properly labelled containers.

Section 7. Handling and storage

Precautions for safe handling

Protective measures: Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits: None

Appropriate engineering controls: Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Body protection:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection:	Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance	
Physical state:	Liquid
Colour:	Colourless
Odour:	Odourless
Odour Threshold:	Not available
pH:	4.01
Melting Point:	Not available
Boiling Point:	100° C
Flash point:	[Product does not sustain combustion.]
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Lower and upper explosive (Flammable) limits:	Not available
Vapour pressure:	Not available
Vapour density:	Not available
Relative density:	Not available
Partition coefficient n- octanol/water:	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available

Section 10. Stability and reactivity

Reactivity:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability:	The product is stable
Possibility of hazardous reactions:	Hazardous reactions or instability may occur under certain conditions of storage or use.
Conditions to avoid:	No specific data
Incompatible materials:	No specific data
Hazardous decomposition Products:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity:	Not available
Irritation/Corrosion:	Not available
Sensitization:	Not available
Mutagenicity:	Not available
Carcinogenicity:	Not available
Reproductive toxicity:	Not available
Teratogenicity:	Not available
Specific target organ toxicity (single exposure):	Not available
Specific target organ toxicity (repeated exposure):	Not available
Aspiration hazard:	Not available
Information on the likely routes of exposure:	Not available

Potential acute effects:

Eye contact:	No known significant effects or critical hazards
Inhalation:	No known significant effects or critical hazards
Skin contact:	No known significant effects or critical hazards
Ingestion:	No known significant effects or critical hazards

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact:	No specific data
Inhalation:	No specific data
Skin contact:	No specific data
Ingestion:	No specific data

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects:	Not available
Potential delayed effects:	Not available

Long term exposure

Potential immediate effects	Not available
Potential delayed effects:	Not available

Potential chronic health effects:	Not available
General:	No known significant effects or critical hazards
Carcinogenicity:	No known significant effects or critical hazards
Mutagenicity:	No known significant effects or critical hazards
Teratogenicity:	No known significant effects or critical hazards
Developmental effects:	No known significant effects or critical hazards
Fertility effects:	No known significant effects or critical hazards

Numerical measures of toxicity

Acute toxicity estimates:	Not available

Section 12. Ecological information

Toxicity:	Not available
Persistence/degradability:	Not available

Bio accumulative potential: Not available

Mobility in soil
Soil/water
partition coefficient (K_{OC}): Not available

Other adverse effects: No known significant effects or critical hazards.

Section 13. Disposal consideration

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non- recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	UN	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user: Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture.
International Inventories:
USINV Complies

CANINV	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Key of abbreviation:
USINV / TSCA: United States Toxic Substanc3es Control Act Section 8(b) Inventory
CANINV / DSL/NDSL: Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS: European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS: Japanese Existing and New Chemical Substances
IECSC: Chinese Inventory of Existing Chemical Substances
KECL: Korean Existing and Evaluated Chemical Substances
PICCS: Philippines Inventory of Chemical and Chemical Substances
AICS: Australian Inventory of Chemical Substances

Chemical safety assessment:
A chemical safety assessment according to regulation (EC) No: 1907/2006 is not required.

Section 16. Other information

History:

Date of issue: 6 March 2018

Key of abbreviation:
ATE: Acute Toxicity Estimate
BCF: Bioconcentration Factor
GHS: Globally harmonized System of classification and labelling of chemicals
IATA: International Air Transport Association
IBC= Intermediate Bulk Container
IMDG International maritime Dangerous goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader:

To the best of our knowledge, the information contained herein is accurate. However, neither the above- named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

HORIBA

SAFETY DATA SHEET

Section 1. Product and Company Identification

Product Name: 525-7, 500-7, 560-7 (pH 7 buffer solution)

Product code: 3999960020, 3999960031, 3999960147

Recommended use: For laboratory and Industrial use

Manufacturer / Supplier: Horiba Instruments (Singapore) Pte Ltd
83 Science Park Drive, #02-02A, The Curie
Singapore-118258
Contact No: +65 69089600

Section 2. Hazard identification

Classification of the Substance or Mixture: Mixture

The mixture is classified as not hazardous according to regulation (EC) 1272/2008, Globally Harmonized System (GHS)

GHS Label elements:

Signal word: No Signal word
Hazard statement: No Known significant effects or critical hazards

Precautionary statements:
General: Do not handle until all safety precautions have been read and understood

Other hazards which do not result in classification: None known

Section 3. Composition/ information on ingredients

Substance or Mixture: Mixture

CAS Numbers other identifiers:

Ingredients	CAS Number	Percentage
Potassium Dihydrogen Phosphate	7778-77-0	<1%
Disodium Hydrogen Phosphate	7558-79-4	<1%
Water	7732-18-5	>98%

This product contains <0.01% other ingredient, not required to be listed as it is not hazardous to health and environment.

The exact percentage of composition has been withheld as a trade secret

Chemical formula: Not applicable

Section 4. First Aid Measures

Description of necessary first aid measures

Eye contact:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Remove any contact lenses. Get medical attention if irritation occurs.
Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact:	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, both acute and delayed

Potential acute health effects: No known significant effects or critical hazards

Over-exposure signs/symptoms: No specific data available

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See toxicological information (Section 11)

Section 5. Firefighting Measures

Extinguishing Media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing Media: No Information available

Specific hazards arising from the substance or mixture: No specific information available

Hazardous thermal decomposition products: No Specific data

Special protective actions for Fire-fighters: Promptly isolate the scene by removing all persons from the incident if there is fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus with a full face-piece operated in positive pressure mode.

Section 6. Accidental release Measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in section 8 on suitable and unsuitable materials. See also the information in “For non-emergency personnel”

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, water ways, soil and air

Methods and material for containment and cleaning up:

Method for Containment: Prevent further leakage or spillage if safe to do so.

Methods of cleaning up: Soak up with inert absorbent material. Pick up and transfer to properly labelled containers.

Section 7. Handling and storage

Precautions for safe handling
Protective measures: Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits: None

Appropriate engineering controls: Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures
Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Hand protection:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Body protection:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection:	Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance	
Physical state:	Liquid
Colour:	Colourless
Odour:	Odourless
Odour Threshold:	Not available
pH:	6.86
Melting Point:	Not available
Boiling Point:	100° C
Flash point:	[Product does not sustain combustion.]
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Lower and upper explosive (Flammable) limits:	Not available
Vapour pressure:	Not available
Vapour density:	Not available
Relative density:	Not available
Partition coefficient n- octanol/water:	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available

Section 10. Stability and reactivity

Reactivity:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability:	The product is stable
Possibility of hazardous reactions:	Hazardous reactions or instability may occur under certain conditions of storage or use.
Conditions to avoid:	No specific data
Incompatible materials:	No specific data
Hazardous decomposition Products:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity:	Not available
Irritation/Corrosion:	Not available
Sensitization:	Not available
Mutagenicity:	Not available
Carcinogenicity:	Not available
Reproductive toxicity:	Not available
Teratogenicity:	Not available
Specific target organ toxicity (single exposure):	Not available
Specific target organ toxicity (repeated exposure):	Not available
Aspiration hazard:	Not available
Information on the likely routes of exposure:	Not available

Potential acute effects:

Eye contact:	No known significant effects or critical hazards
Inhalation:	No known significant effects or critical hazards
Skin contact:	No known significant effects or critical hazards
Ingestion:	No known significant effects or critical hazards

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact:	No specific data
Inhalation:	No specific data
Skin contact:	No specific data
Ingestion:	No specific data

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects:	Not available
Potential delayed effects:	Not available

Long term exposure

Potential immediate effects:	Not available
Potential delayed effects:	Not available

Potential chronic health effects: Not available

General:	No known significant effects or critical hazards
Carcinogenicity:	No known significant effects or critical hazards
Mutagenicity:	No known significant effects or critical hazards
Teratogenicity:	No known significant effects or critical hazards
Developmental effects:	No known significant effects or critical hazards
Fertility effects:	No known significant effects or critical hazards

Numerical measures of toxicity

Acute toxicity estimates: Not available

Section 12. Ecological information

Toxicity: Not available

Persistence/degradability: Not available

Bio accumulative potential: Not available

Mobility in soil

Soil/water partition coefficient (K_{OC}): Not available

Other adverse effects: No known significant effects or critical hazards.

Section 13. Disposal consideration

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non- recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	UN	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user: Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture.

International Inventories:

USINV	Complies
CANINV	Complies
EINECS/ELINCS	Complies
ENCS	Complies

IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Key of abbreviation:
USINV / TSCA: United States Toxic Substanc3es Control Act Section 8(b) Inventory
CANINV / DSL/NDSL: Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS: European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS: Japanese Existing and New Chemical Substances
IECSC: Chinese Inventory of Existing Chemical Substances
KECL: Korean Existing and Evaluated Chemical Substances
PICCS: Philippines Inventory of Chemical and Chemical Substances
AICS: Australian Inventory of Chemical Substances

Chemical safety assessment:
A chemical safety assessment according to regulation (EC) No: 1907/2006 is not required.

Section 16. Other information

History:

Date of issue: 28 Feb 2018

Key of abbreviation:
ATE: Acute Toxicity Estimate
BCF: Bioconcentration Factor
GHS: Globally harmonized System of classification and labelling of chemicals
IATA: International Air Transport Association
IBC= Intermediate Bulk Container
IMDG International maritime Dangerous goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader:

To the best of our knowledge, the information contained herein is accurate. However, neither the above- named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

HORIBA

SAFETY DATA SHEET

Section 1. Product and Company Identification

Product Name: 525-10, 500-10, 560-10 (pH 10.01 buffer solution)

Product code: 3999960022, 3999960033, 3999960138

Recommended use: For laboratory and Industrial use

Manufacturer / Supplier: Horiba Instruments (Singapore) Pte Ltd
83 Science Park Drive, #02-02A, The Curie
Singapore-118258
Contact No: +65 69089600

Section 2. Hazard identification

Classification of the Substance or Mixture: Mixture

The mixture is classified as not hazardous according to regulation (EC) 1272/2008, Globally Harmonized System (GHS)

GHS Label elements:

Signal word: No Signal word
Hazard statement: No Known significant effects or critical hazards

Precautionary statements:
General: Do not handle until all safety precautions have been read and understood

Other hazards which do not result in classification: None known

Section 3. Composition/ information on ingredients

Substance or Mixture: Mixture

CAS Numbers other identifiers:

Ingredients	CAS Number	Percentage
Sodium Carbonate	497-19-8	<1%
Sodium Bicarbonate	144-55-8	<1%
Water	7732-18-5	>98%

This product contains <0.01% other ingredient, not required to be listed as it is not hazardous to health and environment.

The exact percentage of composition has been withheld as a trade secret

Chemical formula: Not applicable

Section 4. First Aid Measures

Description of necessary first aid measures

Eye contact:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Remove any contact lenses. Get medical attention if irritation occurs.
Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact:	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion	Clean mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, both acute and delayed

Potential acute health effects: No known significant effects or critical hazards

Over-exposure signs/symptoms: No specific data available

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See toxicological information (Section 11)

Section 5. Firefighting Measures

Extinguishing Media

Suitable extinguishing media: Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing Media: No Information available

Specific hazards arising from the substance or mixture: No specific information available

Hazardous thermal decomposition products: No Specific data

Special protective actions for Fire-fighters: Promptly isolate the scene by removing all persons from the incident if there is fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus with a full face-piece operated in positive pressure mode.

Section 6. Accidental release Measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel: No action shall be taken involving any personal risk or without suitable training. Evacuate

surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material

For emergency responders: If specialized clothing is required to deal with the spillage, take note of any information in section 8 on suitable and unsuitable materials. See also the information in “For non-emergency personnel”

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, water ways, soil and air

Methods and material for containment and cleaning up:

Method for Containment: Prevent further leakage or spillage if safe to do so.

Methods of cleaning up: Soak up with inert absorbent material. Pick up and transfer to properly labelled containers.

Section 7. Handling and storage

Precautions for safe handling
Protective measures: Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits: None

Appropriate engineering controls: Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures
Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with

side-shields.

Skin protection

Hand protection:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Body protection:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection:	Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance

Physical state:	Liquid
Colour:	Colourless
Odour:	Odourless
Odour Threshold:	Not available
pH:	10.01
Melting Point:	Not available
Boiling Point:	100° C
Flash point:	[Product does not sustain combustion.]
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Lower and upper explosive (Flammable) limits:	Not available
Vapour pressure:	Not available
Vapour density:	Not available
Relative density:	Not available
Partition coefficient n- octanol/water:	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available

Section 10. Stability and reactivity

Reactivity:	No specific test data related to reactivity available for this product or its ingredients.
Chemical stability:	The product is stable
Possibility of hazardous reactions:	Hazardous reactions or instability may occur under certain conditions of storage or use.
Conditions to avoid:	No specific data
Incompatible materials:	No specific data
Hazardous decomposition	

Products:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity:	Not available
Irritation/Corrosion:	Not available
Sensitization:	Not available
Mutagenicity:	Not available
Carcinogenicity:	Not available
Reproductive toxicity:	Not available
Teratogenicity:	Not available
Specific target organ: toxicity (single exposure):	Not available
Specific target organ toxicity (repeated exposure):	Not available
Aspiration hazard:	Not available
Information on the likely routes of exposure:	Not available

Potential acute effects:

Eye contact:	No known significant effects or critical hazards
Inhalation:	No known significant effects or critical hazards
Skin contact:	No known significant effects or critical hazards
Ingestion:	No known significant effects or critical hazards

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact:	No specific data.
Inhalation:	No specific data.
Skin contact:	No specific data.
Ingestion:	No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effect:	Not available
Potential delayed effects:	Not available

Long term exposure

Potential immediate effects:	Not available
Potential delayed effects:	Not available

Potential chronic health effects:	Not available
General:	No known significant effects or critical hazards
Carcinogenicity:	No known significant effects or critical hazards
Mutagenicity:	No known significant effects or critical hazards
Teratogenicity:	No known significant effects or critical hazards
Developmental effects:	No known significant effects or critical hazards
Fertility effects:	No known significant effects or critical hazards

Numerical measures of toxicity

Acute toxicity estimates:	Not available

Section 12. Ecological information

Toxicity:	Not available
Persistence/degradability:	Not available
Bio accumulative potential:	Not available

Mobility in soil
Soil/water partition coefficient (K_{OC}): Not available

Other adverse effects: No known significant effects or critical hazards.

Section 13. Disposal consideration

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non- recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	UN	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user: Transport within user's premises: always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture.
International Inventories:

USINV	Complies
CANINV	Complies
EINECS/ELINCS	Complies
ENCS	Complies

IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Key of abbreviation:
USINV / TSCA: United States Toxic Substanc3es Control Act Section 8(b) Inventory
CANINV / DSL/NDSL: Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS: European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS: Japanese Existing and New Chemical Substances
IECSC: Chinese Inventory of Existing Chemical Substances
KECL: Korean Existing and Evaluated Chemical Substances
PICCS: Philippines Inventory of Chemical and Chemical Substances
AICS: Australian Inventory of Chemical Substances

Chemical safety assessment:
A chemical safety assessment according to regulation (EC) No: 1907/2006 is not required.

Section 16. Other information

History:

Date of issue: 6 March 2018

Key of abbreviation:
ATE: Acute Toxicity Estimate
BCF: Bioconcentration Factor
GHS: Globally harmonized Syatem of classification and labelling of chemicals
IATA: International Air Transport Association
IBC= Intermediate Bulk Container
IMDG International maritime Dangerous goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

Notice to reader:

To the best of our knowledge, the information contained herein is accurate. However, neither the above- named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

HORIBA

SAFETY DATA SHEET

Section 1. Product and Company Identification

Product Name: 525-3; 560-3 (internal filling solution for pH combination electrode)

Product code: 3999960023; 3999960139

Recommended use: For laboratory and Industrial use

Manufacturer / Supplier: Horiba Instruments (Singapore) Pte Ltd
83 Science Park Drive, #02-02A, The Curie
Singapore-118258
Contact No: +65 69089660

Section 2. Hazard identification

Classification of the Substance or Mixture: Mixture

The mixture is classified as not hazardous according to regulation (EC) 1272/2008, Globally Harmonized System (GHS)

GHS Label elements:

Signal word: No Signal word
Hazard statement: No Known significant effects or critical hazards

Precautionary statements:
General: Do not handle until all safety precautions have been read and understood

Other hazards which do not result in classification: None known

Section 3. Composition/ information on ingredients

Substance or Mixture: Mixture

CAS Numbers other identifiers:

Ingredients	CAS Number	Percentage
Potassium Chloride	7447-40-7	<25%
Water	7732-18-5	>75%

The exact percentage of composition has been withheld as a trade secret

Chemical formula: Not applicable

Section 4. First Aid Measures

Description of necessary first aid measures

Eye contact:	Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Remove any contact lenses. Get medical attention if irritation occurs.
Inhalation:	Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.
Skin contact:	Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.
Ingestion:	Clean mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, both acute and delayed

Potential acute health effects:

Eye contact: Causes eye irritation

Over-exposure signs/symptoms: No specific data available

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician: Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

See toxicological information (Section 11)

Section 5. Firefighting Measures

Extinguishing Media

Suitable extinguishing media:	Use an extinguishing agent suitable for the surrounding fire.
Unsuitable extinguishing Media:	No Information available
Specific hazards arising from the substance or mixture:	No specific information available
Hazardous thermal decomposition products:	No Specific data
Special protective actions for Fire-fighters:	Promptly isolate the scene by removing all persons from the incident if there is fire. No action shall be taken involving any personal risk or without suitable training
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment self- contained breathing apparatus with a full face-piece operated in positive pressure mode.

Section 6. Accidental release Measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel:	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material.
For emergency responders:	If specialized clothing is required to deal with the spillage, take note of any information

In section 8 on suitable and unsuitable materials. See also the information in “For non-emergency personnel”.

Environmental precautions: Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, water ways, soil and air.

Methods and material for containment and cleaning up:

Method for Containment: Prevent further leakage or spillage if safe to do so.

Methods of cleaning up: Soak up with inert absorbent material. Pick up and transfer to properly labelled containers.

Section 7. Handling and storage

Precautions for safe handling
Protective measures: Put on appropriate personal protective equipment (see Section 8).

Advice on general occupational hygiene: Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

Conditions for safe storage, including any incompatibilities: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabelled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters
Occupational exposure limits: None

Appropriate engineering controls: Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process Equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures
Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection: Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection
Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should

	be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Body protection:	Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Other skin protection:	Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
Respiratory protection:	Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use.

Section 9. Physical and chemical properties

Appearance	
Physical state:	Liquid
Colour:	Colourless
Odour:	Odourless
Odour Threshold:	Not available
pH:	Not available
Melting Point:	Not available
Boiling Point:	100° C
Flash point:	[Product does not sustain combustion.]
Evaporation rate:	Not available
Flammability (solid, gas):	Not available
Lower and upper explosive: (Flammable) limits	Not available
Vapour pressure:	Not available
Vapour density:	Not available
Relative density:	Not available
Partition coefficient: n- octanol/water	Not available
Auto-ignition temperature:	Not available
Decomposition temperature:	Not available
Viscosity:	Not available

Section 10. Stability and reactivity

Reactivity:	No specific test data related to reactivity available for this product or its ingredients
Chemical stability:	The product is stable
Possibility of hazardous:	Under normal conditions of storage and use, hazardous reactions will not occur.
Conditions to avoid:	No specific data
Incompatible materials:	No specific data
Hazardous decomposition: Products	Under normal conditions of storage and use, hazardous decomposition products should be produced

Section 11. Toxicological Information

Information on toxicological effects

Acute toxicity:	Not available
Irritation/Corrosion:	Not available
Sensitization:	Not available
Mutagenicity:	Not available
Carcinogenicity:	Not available
Reproductive toxicity:	Not available
Teratogenicity:	Not available
Specific target organ toxicity (single exposure):	Not available
Specific target organ: toxicity (repeated exposure):	Not available
Aspiration hazard:	Not available
Information on the likely: routes of exposure	Not available

Potential acute health effects:

Eye contact:	Causes eye irritation
Inhalation:	No known significant effects or critical hazards
Skin contact:	No known significant effects or critical hazards
Ingestion:	No known significant effects or critical hazards

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact:	Adverse symptoms may include irritation, watering and redness
Inhalation:	No specific data
Skin contact:	No specific data
Ingestion:	No specific data

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate: effects	Not available
Potential delayed effects:	Not available

Long term exposure

Potential immediate: effects	Not available
Potential delayed effects:	Not available

Potential chronic health effects:	Not available
General:	No known significant effects or critical hazards
Carcinogenicity:	No known significant effects or critical hazards
Mutagenicity:	No known significant effects or critical hazards
Teratogenicity:	No known significant effects or critical hazards
Developmental effects:	No known significant effects or critical hazards
Fertility effects:	No known significant effects or critical hazards

Numerical measures of toxicity

Acute toxicity estimates:	Not available

Section 12. Ecological information

Toxicity: Not available

Persistence/degradability: Not available

Bio accumulative potential: Not available

Mobility in soil
Soil/water
partition coefficient (K_{OC}): Not available

Other adverse effects: No known significant effects or critical hazards.

Section 13. Disposal consideration

Disposal methods: The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non- recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	UN	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user: Transport within user's premises: always transport in closed containers that are ` upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Section 15. Regulatory information

Safety, health and environmental regulations/legislation specific for the substance or mixture.
International Inventories:

USINV	Complies
CANINV	Complies
EINECS/ELINCS	Complies
ENCS	Complies
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Key of abbreviation:
USINV / TSCA: United States Toxic Substanc3es Control Act Section 8(b) Inventory
CANINV / DSL/NDSL: Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS: European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
ENCS: Japanese Existing and New Chemical Substances
IECSC: Chinese Inventory of Existing Chemical Substances
KECL: Korean Existing and Evaluated Chemical Substances
PICCS: Philippines Inventory of Chemical and Chemical Substances
AICS: Australian Inventory of Chemical Substances

Chemical safety assessment:
A chemical safety assessment according to regulation (EC) No: 1907/2006 is not required.

Section 16. Other information

History:

Date of issue: 8 March 2018

Key of abbreviation:

ATE: Acute Toxicity Estimate

BCF: Bioconcentration Factor

GHS: Globally harmonized Syatem of classification and labelling of chemicals

IATA: International Air Transport Association

IBC= Intermediate Bulk Container

IMDG International maritime Dangerous goods

LogPow = logarithm of the octanol/water partition coefficient

MARPOL = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)

UN = United Nations

Notice to reader:

To the best of our knowledge, the information contained herein is accurate. However, neither the above- named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Isobutylene

Section 1. Identification

GHS product identifier : Isobutylene

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product type : Gas.

Product use : Synthetic/Analytical chemistry.

Synonym : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

SDS # : 001031

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

24-hour telephone : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : FLAMMABLE GASES - Category 1
GASES UNDER PRESSURE - Liquefied gas

GHS label elements

Hazard pictograms :



Signal word : Danger

Hazard statements : Extremely flammable gas.
May form explosive mixtures with air.
Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction. Always keep container in upright position. Approach suspected leak area with caution.

Prevention : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Response : Leaking gas fire: Do not extinguish, unless leak can be stopped safely. Eliminate all ignition sources if safe to do so.

Storage : Protect from sunlight. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : 2-methylpropene

Other means of identification : 1-Propene, 2-methyl-; Isobutene; Isobutylene; 1-Propene, 2-methyl- (isobutene); 1, 1-Dimethylethylene; Isopropylidenemethylene; iso-Butene; i-Butene; 2-Methylpropylene; 2-Methyl-2-propene; 2-Methyl-1-propene

Product code : 001031

CAS number/other identifiers

CAS number : 115-11-7

Ingredient name	%	CAS number
Isobutylene	100	115-11-7

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. To avoid the risk of static discharges and gas ignition, soak contaminated clothing thoroughly with water before removing it. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. Extremely flammable gas. In a fire or if heated, a pressure increase will occur and the container may burst, with the risk of a subsequent explosion.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool. If involved in fire, shut off flow immediately if it can be done without risk. If this is impossible, withdraw from area and allow fire to burn. Fight fire from protected location or maximum possible distance. Eliminate all ignition sources if safe to do so.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : Accidental releases pose a serious fire or explosion hazard. No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialized clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Use spark-proof tools and explosion-proof equipment. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid breathing gas. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Do not enter storage areas and confined spaces unless adequately ventilated. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Use only non-sparking tools. Avoid contact with eyes, skin and clothing. Empty containers retain product residue and can be hazardous. Store and use away from heat, sparks, open flame or any other ignition source. Use explosion-proof electrical (ventilating, lighting and material handling) equipment.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Eliminate all ignition sources. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F). Keep container tightly closed and sealed until ready for use. See Section 10 for incompatible materials before handling or use.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Isobutylene	**ACGIH TLV (United States, 3/2017).** TWA: 250 ppm 8 hours.

Appropriate engineering controls : Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. The engineering controls also need to keep gas, vapor or dust concentrations below any lower explosive limits. Use explosion-proof ventilation equipment.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product. When there is a risk of ignition from static electricity, wear anti-static protective clothing. For the greatest protection from static discharges, clothing should include anti-static overalls, boots and gloves.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Based on the hazard and potential for exposure, select a respirator that meets the appropriate standard or certification. Respirators must be used according to a respiratory protection program to ensure proper fitting, training, and other important aspects of use. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Odor : Characteristic.

Odor threshold : Not available.

pH : Not available.

Melting point : -140.7°C (-221.3°F)

Boiling point : -6.9°C (19.6°F)

Critical temperature : 144.75°C (292.6°F)

Flash point : Closed cup: -76.1°C (-105°F)

Evaporation rate : Not available.

Flammability (solid, gas) : Extremely flammable in the presence of the following materials or conditions: open flames, sparks and static discharge and oxidizing materials.

Lower and upper explosive (flammable) limits : Lower: 1.8%
Upper: 9.6%

Vapor pressure : 24.3 (psig)

Vapor density : 1.94 (Air = 1)

Specific Volume (ft ^{3}/lb) : 6.6845

Gas Density (lb/ft ^{3}) : 0.1496 (25°C / 77 to °F)

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : 0.26 g/l

Partition coefficient: n-octanol/water : 2.34

Auto-ignition temperature : 465°C (869°F)

Decomposition temperature : Not available.

Viscosity : Not applicable.

Flow time (ISO 2431) : Not available.

Molecular weight : 56.12 g/mole

Aerosol product

Heat of combustion : -45029034 J/kg

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : Avoid all possible sources of ignition (spark or flame). Do not pressurize, cut, weld, braze, solder, drill, grind or expose containers to heat or sources of ignition.

Incompatible materials : Oxidizers

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Isobutylene	LC50 Inhalation Vapor	Rat	550000 mg/m³	4 hours

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : No known significant effects or critical hazards.

Section 11. Toxicological information

Inhalation : No known significant effects or critical hazards.

Skin contact : No known significant effects or critical hazards.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Isobutylene	2.34	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Section 12. Ecological information

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1055	UN1055	UN1055	UN1055	UN1055
UN proper shipping name	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE	ISOBUTYLENE
Transport hazard class(es)	2.1 	2.1 	2.1 	2.1 	2.1 
Packing group	-	-	-	-	-
Environmental hazards	No.	No.	No.	No.	No.

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

Additional information

DOT Classification : **Limited quantity** Yes.
Quantity limitation Passenger aircraft/rail: Forbidden. Cargo aircraft: 150 kg.
Special provisions 19, T50

TDG Classification : Product classified as per the following sections of the Transportation of Dangerous Goods Regulations: 2.13-2.17 (Class 2).
Explosive Limit and Limited Quantity Index 0.125
ERAP Index 3000
Passenger Carrying Ship Index Forbidden
Passenger Carrying Road or Rail Index Forbidden
Special provisions 29

IATA : **Quantity limitation** Passenger and Cargo Aircraft: Forbidden. Cargo Aircraft Only: 150 kg.

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

Clean Air Act (CAA) 112 regulated flammable substances: Isobutylene

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Refer to Section 2: Hazards Identification of this SDS for classification of substance.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Inventory list

Australia : This material is listed or exempted.

Canada : This material is listed or exempted.

China : This material is listed or exempted.

Europe : This material is listed or exempted.

Japan : **Japan inventory (ENCS)**: This material is listed or exempted.
Japan inventory (ISHL): Not determined.

Malaysia : Not determined.

New Zealand : This material is listed or exempted.

Philippines : This material is listed or exempted.

Republic of Korea : This material is listed or exempted.

Section 15. Regulatory information

Taiwan : This material is listed or exempted.

Thailand : Not determined.

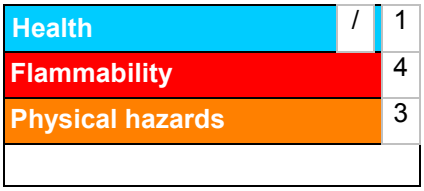
Turkey : Not determined.

United States : This material is listed or exempted.

Viet Nam : Not determined.

Section 16. Other information

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings and the associated label are not required on SDSs or products leaving a facility under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered trademark and service mark of the American Coatings Association, Inc.

The customer is responsible for determining the PPE code for this material. For more information on HMIS® Personal Protective Equipment (PPE) codes, consult the HMIS® Implementation Manual.

National Fire Protection Association (U.S.A.)



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Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
FLAMMABLE GASES - Category 1 GASES UNDER PRESSURE - Liquefied gas	Expert judgment Expert judgment

History

Date of printing : 5/10/2018

Date of issue/Date of revision : 5/10/2018

Date of previous issue : 7/11/2016

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL = International Convention for the Prevention of Pollution From Ships, 1973

Section 16. Other information

as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United Nations

References : Not available.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

SAFETY DATA SHEET

Version 4.10
Revision Date 04/22/2016
Print Date 05/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Sudan Blue II

Product Number : 306436
Brand : Sigma-Aldrich

CAS-No. : 17354-14-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Solvent Blue 35

Formula : $C_{22}H_{26}N_2O_2$
Molecular weight : 350.45 g/mol
CAS-No. : 17354-14-2
EC-No. : 241-379-4

No components need to be disclosed according to the applicable regulations.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: dark violet
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing	Melting point/range: 120 - 122 °C (248 - 252 °F)

	point	
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
1,4-Bis(butylamino)anthraquinone	17354-14-2	1989-08-11

New Jersey Right To Know Components

	CAS-No.	Revision Date
1,4-Bis(butylamino)anthraquinone	17354-14-2	1989-08-11

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.10 Revision Date: 04/22/2016 Print Date: 05/01/2016

SAFETY DATA SHEET

Creation Date 08-Nov-2010 **Revision Date** 18-Jun-2015 **Revision Number** 2

1. Identification

Product Name **Fluoranthene**

Cat No. : **AC119170000; AC119170250; AC119171000; AC119175000**

Synonyms Benzo[j,k]fluorene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed



Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell

Rinse mouth

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Fluoranthene	206-44-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Get medical attention.

Most important symptoms/effects No information available.

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. alcohol-resistant foam.

Unsuitable Extinguishing Media No information available

Flash Point 100 °C / 212 °F

Method - No information available

Autoignition Temperature No information available

Explosion Limits

Upper No data available

Lower No data available

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products

Carbon monoxide (CO) Carbon dioxide (CO_2)

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.

Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Avoid dust formation.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Light green
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	109 - 111 °C / 228.2 - 231.8 °F
Boiling Point/Range	384 - 34 °C / 723.2 - 93.2 °F
Flash Point	100 °C / 212 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C16 H10
Molecular Weight	202.25

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Fluoranthene	2 g/kg (Rat)	3180 mg/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Fluoranthene	206-44-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Fluoranthene	Not listed	Oncorhynchus mykiss: LC50=0.0077 mg/L 96h	Not listed	EC50: 0.78 mg/L 20h

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Fluoranthene	5.33

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Fluoranthene - 206-44-0	U120	-

14. Transport information

DOT
- **UN-No** UN3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
- **Proper technical name** (Fluoranthene)
- **Hazard Class** 9
- **Packing Group** III

TDG
- **UN-No** UN3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
- **Hazard Class** 9
- **Packing Group** III

IATA
- **UN-No** UN3077
- **Proper Shipping Name** Environmentally hazardous substance, solid, n.o.s
- **Hazard Class** 9
- **Packing Group** III

IMDG/IMO
- **UN-No** UN3077
- **Proper Shipping Name** Environmentally hazardous substance, solid, n.o.s
- **Hazard Class** 9
- **Packing Group** III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Fluoranthene	X	-	X	205-912-4	-		-	X	X	X	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).

Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Fluoranthene	206-44-0	>95	1.0 0.1

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Fluoranthene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Fluoranthene	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Fluoranthene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials



16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	08-Nov-2010
Revision Date	18-Jun-2015
Print Date	18-Jun-2015
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Fluorene**

Cat No. : **AC156130000; AC156130250; AC156131000; AC156135000**

Synonyms Diphenylenemethane

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
Classification under 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Label Elements
None required

Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects
May form combustible dust concentrations in air

3. Composition / information on ingredients

Component	CAS-No	Weight %
Fluorene	86-73-7	98

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated

clothes and shoes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. Obtain medical attention.

Ingestion Clean mouth with water. Get medical attention.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point 151 °C / 303.8 °F
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Dust can form an explosive mixture in air. Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
None known
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
0	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not ingest.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	No protective equipment is needed under normal use conditions.
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	112 - 116 °C / 233.6 - 240.8 °F
Boiling Point/Range	298 °C / 568.4 °F @ 760 mmHg
Flash Point	151 °C / 303.8 °F
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	13 hPa @ 146 °C
Vapor Density	Not applicable
Relative Density	1.200
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition Temperature	No information available
Viscosity	Not applicable
Molecular Formula	C13 H10
Molecular Weight	166.22

10. Stability and reactivity

Reactive Hazard	None known, based on information available
Stability	Stable under normal conditions.
Conditions to Avoid	Incompatible products.
Incompatible Materials	Strong oxidizing agents
Hazardous Decomposition Products	None under normal use conditions
Hazardous Polymerization	No information available.
Hazardous Reactions	None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information	No acute toxicity information is available for this product
Component Information	

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Fluorene	86-73-7	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Persistence and Degradability Insoluble in water May persist
Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Fluorene	4.18

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA
- **UN-No** 3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*
- **Hazard Class** 9
- **Packing Group** III

IMDG/IMO

UN-No	3077
Proper Shipping Name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class	9
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Fluorene	X	X	-	201-695-5	-		X	X	X	X	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	No
Chronic Health Hazard	No
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Fluorene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Fluorene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Fluorene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class B4 Flammable solid



16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

Safety Data Sheet

Material Name: Fuel Oil No. 2

SDS No. 0088
EU/CLP GHS

Synonyms: #2 Heating Oil; 2 Oil; Off-road Diesel Fuel

* * * Section 1 - Product and Company Identification * * *

Manufacturer Information

Hess Corporation
1 Hess Plaza
Woodbridge, NJ 07095-0961

Phone: 732-750-6000 Corporate EHS
Emergency # 800-424-9300 CHEMTREC
www.hess.com (Environment, Health, Safety Internet Website)

* * * Section 2 - Hazards Identification * * *

GHS Classification:

Flammable Liquids - Category 3
Acute Toxicity, Inhalation - Category 4
Skin Corrosion/Irritation – Category 2
Eye Damage/Irritation – Category 2
Carcinogenicity - Category 2
Specific Target Organ Toxicity (Single Exposure) – Category 3 (respiratory irritation, narcosis)
Aspiration Hazard – Category 1
Hazardous to the Aquatic Environment, Acute Hazard – Category 3

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statements

Flammable liquid and vapor.
Harmful if inhaled.
Causes skin irritation.
Causes eye irritation.
Suspected of causing cancer.
Suspected of causing genetic defects.
May cause respiratory irritation.
May cause drowsiness or dizziness.
May be fatal if swallowed and enters airways.
Harmful to aquatic life.

Precautionary Statements

Prevention

Keep away from heat/sparks/open flames/hot surfaces. No smoking
Keep container tightly closed.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Wear protective gloves/protective clothing/eye protection/face protection.
Avoid breathing fume/mist/vapors/spray.
Use only outdoors or in a well-ventilated area.
Wash hands and forearms thoroughly after handling.
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Avoid release to the environment.

Response

In case of fire: Use water spray, fog or foam.
If on skin (or hair): Wash with plenty of soap and water. Take off immediately all contaminated clothing and wash it before reuse. If skin irritation occurs, get medical advice/attention.
If inhaled: Remove person to fresh air and keep comfortable for breathing. Call a poison center or doctor if you feel unwell.
If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
If exposed or concerned: Get medical advice/attention.
If swallowed: Immediately all a poison center or doctor/physician if you feel unwell. Do NOT induce vomiting.

Storage

Store in a well ventilated place.
Keep cool. Keep container tightly closed.
Store locked up.

Disposal

Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 3 - Composition / Information on Ingredients * * *

CAS #	Component	Percent
68476-30-2	Fuel oil No. 2	100
91-20-3	Naphthalene	<0.1

A complex combination of hydrocarbons with carbon numbers in the range C9 and higher produced from the distillation of petroleum crude oil.

* * * Section 4 - First Aid Measures * * *

First Aid: Eyes

In case of contact with eyes, immediately flush with clean, low-pressure water for at least 15 min. Hold eyelids open to ensure adequate flushing. Seek medical attention.

First Aid: Skin

Remove contaminated clothing. Wash contaminated areas thoroughly with soap and water or with waterless hand cleanser. Obtain medical attention if irritation or redness develops.

First Aid: Ingestion

DO NOT INDUCE VOMITING. Do not give liquids. Obtain immediate medical attention. If spontaneous vomiting occurs, lean victim forward to reduce the risk of aspiration. Monitor for breathing difficulties. Small amounts of material which enter the mouth should be rinsed out until the taste is dissipated.

First Aid: Inhalation

Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

* * * Section 5 - Fire Fighting Measures * * *

General Fire Hazards

See Section 9 for Flammability Properties.

Vapors may be ignited rapidly when exposed to heat, spark, open flame or other source of ignition. When mixed with air and exposed to an ignition source, flammable vapors can burn in the open or explode in confined spaces. Being heavier than air, vapors may travel long distances to an ignition source and flash back. Runoff to sewer may cause fire or explosion hazard.

Hazardous Combustion Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

Extinguishing Media

SMALL FIRES: Any extinguisher suitable for Class B fires, dry chemical, CO2, water spray, fire fighting foam, or gaseous extinguishing agent.

LARGE FIRES: Water spray, fog or fire fighting foam. Water may be ineffective for fighting the fire, but may be used to cool fire-exposed containers.

Unsuitable Extinguishing Media

None

Fire Fighting Equipment/Instructions

Small fires in the incipient (beginning) stage may typically be extinguished using handheld portable fire extinguishers and other fire fighting equipment. Firefighting activities that may result in potential exposure to high heat, smoke or toxic by-products of combustion should require NIOSH/MSHA- approved pressure-demand self-contained breathing apparatus with full facepiece and full protective clothing. Isolate area around container involved in fire. Cool tanks, shells, and containers exposed to fire and excessive heat with water. For massive fires the use of unmanned hose holders or monitor nozzles may be advantageous to further minimize personnel exposure. Major fires may require withdrawal, allowing the tank to burn. Large storage tank fires typically require specially trained personnel and equipment to extinguish the fire, often including the need for properly applied fire fighting foam.

* * * Section 6 - Accidental Release Measures * * *

Recovery and Neutralization

Carefully contain and stop the source of the spill, if safe to do so.

Materials and Methods for Clean-Up

Take up with sand or other oil absorbing materials. Carefully shovel, scoop or sweep up into a waste container for reclamation or disposal.

Emergency Measures

Evacuate nonessential personnel and remove or secure all ignition sources. Consider wind direction; stay upwind and uphill, if possible. Evaluate the direction of product travel, diking, sewers, etc. to confirm spill areas. Spills may infiltrate subsurface soil and groundwater; professional assistance may be necessary to determine the extent of subsurface impact.

Personal Precautions and Protective Equipment

Response and clean-up crews must be properly trained and must utilize proper protective equipment (see Section 8).

Environmental Precautions

Protect bodies of water by diking, absorbents, or absorbent boom, if possible. Do not flush down sewer or drainage systems, unless system is designed and permitted to handle such material. The use of fire fighting foam may be useful in certain situations to reduce vapors. The proper use of water spray may effectively disperse product vapors or the liquid itself, preventing contact with ignition sources or areas/equipment that require protection.

Prevention of Secondary Hazards

None

* * * Section 7 - Handling and Storage * * *

Handling Procedures

Handle as a combustible liquid. Keep away from heat, sparks, excessive temperatures and open flame! No smoking or open flame in storage, use or handling areas. Bond and ground containers during product transfer to reduce the possibility of static-initiated fire or explosion.

Special slow load procedures for "switch loading" must be followed to avoid the static ignition hazard that can exist when this product is loaded into tanks previously containing low flash point products (such as gasoline) - see API Publication 2003, "Protection Against Ignitions Arising Out Of Static, Lightning and Stray Currents."

Storage Procedures

Keep containers closed and clearly labeled. Use approved vented storage containers. Empty product containers or vessels may contain explosive vapors. Do not pressurize, cut, heat, weld or expose such containers to sources of ignition.

Store in a well-ventilated area. This storage area should comply with NFPA 30 "Flammable and Combustible Liquid Code". Avoid storage near incompatible materials. The cleaning of tanks previously containing this product should follow API Recommended Practice (RP) 2013 "Cleaning Mobile Tanks In Flammable and Combustible Liquid Service" and API RP 2015 "Cleaning Petroleum Storage Tanks."

Incompatibilities

Keep away from strong oxidizers; Fluorel ®

* * * Section 8 - Exposure Controls / Personal Protection * * *

Component Exposure Limits

Fuel oil No. 2 (270-671-4)

ACGIH: 100 mg/m3 TWA (inhalable fraction and vapor, as total hydrocarbons, listed under Diesel fuel)
Skin - potential significant contribution to overall exposure by the cutaneous route (listed under Diesel fuel)

Belgium: 100 mg/m3 TWA (as total hydrocarbon, aerosol and vapor)
Skin (listed under Gas oil)

Portugal: 100 mg/m3 TWA [VLE-MP] (aerosol and vapor, as total Hydrocarbons, listed under Fuel diesel)

Naphthalene (202-049-5)

ACGIH: 15 ppm STEL
10 ppm TWA
Skin - potential significant contribution to overall exposure by the cutaneous route

Austria: 10 ppm TWA [TMW]; 50 mg/m3 TWA [TMW]
skin notation

Belgium: 15 ppm STEL; 80 mg/m3 STEL
10 ppm TWA; 53 mg/m3 TWA
Skin

Denmark: 10 ppm TWA; 50 mg/m3 TWA

Finland: 2 ppm STEL; 10 mg/m3 STEL
1 ppm TWA; 5 mg/m3 TWA

France: 10 ppm TWA [VME]; 50 mg/m3 TWA [VME]

Germany: 0.1 ppm TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1); 0.5 mg/m3 TWA AGW (The risk of damage to the embryo or fetus can be excluded when MAK and BAT values are observed, inhalable fraction, exposure factor 1)

Greece: 10 ppm TWA; 50 mg/m3 TWA

Ireland: 15 ppm STEL; 75 mg/m3 STEL
10 ppm TWA; 50 mg/m3 TWA

Netherlands: 80 mg/m3 STEL
50 mg/m3 TWA

Portugal: 10 ppm TWA [VLE-MP]

Spain: 15 ppm STEL [VLA-EC]; 80 mg/m3 STEL [VLA-EC]
10 ppm TWA [VLA-ED]; 53 mg/m3 TWA [VLA-ED]
skin - potential for cutaneous exposure

Sweden: 10 ppm LLV; 50 mg/m3 LLV
15 ppm STV; 80 mg/m3 STV

Engineering Measures

Use adequate ventilation to keep vapor concentrations of this product below occupational exposure and flammability limits, particularly in confined spaces.

Personal Protective Equipment: Respiratory

A NIOSH/MSHA-approved air-purifying respirator with organic vapor cartridges or canister may be permissible under certain circumstances where airborne concentrations are or may be expected to exceed exposure limits or for odor or irritation. Protection provided by air-purifying respirators is limited.

Use a positive pressure, air-supplied respirator if there is a potential for uncontrolled release, exposure levels are not known, in oxygen-deficient atmospheres, or any other circumstance where an air-purifying respirator may not provide adequate protection.

Personal Protective Equipment: Hands

Gloves constructed of nitrile, neoprene, or PVC are recommended.

Personal Protective Equipment: Eyes

Safety glasses or goggles are recommended where there is a possibility of splashing or spraying.

Personal Protective Equipment: Skin and Body

Chemical protective clothing such as of E.I. DuPont TyChem®, Saranex® or equivalent recommended based on degree of exposure. Note: The resistance of specific material may vary from product to product as well as with degree of exposure. Consult manufacturer specifications for further information.

* * * Section 9 - Physical & Chemical Properties * * *

Appearance:	Red or reddish/orange colored (dyed)	**Odor:**	Mild, petroleum distillate odor
Physical State:	Liquid	**pH:**	ND
Vapor Pressure:	0.009 psia @ 70 °F (21 °C)	**Vapor Density:**	>1.0
Boiling Point:	340 to 700 °F (171 to 371 °C)	**Melting Point:**	ND
Solubility (H2O):	Negligible	**Specific Gravity:**	AP 0.823-0871
Evaporation Rate:	Slow; varies with conditions	**VOC:**	ND
Octanol/H2O Coeff.:	ND	**Flash Point:**	100 °F (38 °C) minimum
Flash Point Method:	PMCC	**Upper Flammability Limit (UFL):**	7.5
Lower Flammability Limit (LFL):	0.6	**Burning Rate:**	ND
Auto Ignition:	494°F (257°C)		

* * * Section 10 - Chemical Stability & Reactivity Information * * *

Chemical Stability

This is a stable material.

Hazardous Reaction Potential

Will not occur.

Conditions to Avoid

Avoid high temperatures, open flames, sparks, welding, smoking and other ignition sources.

Incompatible Products

Keep away from strong oxidizers; Fluorel ®

Hazardous Decomposition Products

Carbon monoxide, carbon dioxide and non-combusted hydrocarbons (smoke).

* * * Section 11 - Toxicological Information * * *

Acute Toxicity

A: General Product Information

Harmful if swallowed.

B: Component Analysis - LD50/LC50

Fuel oil No. 2 (68476-30-2)

Oral LD50 Rat 12 g/kg; Dermal LD50 Rabbit 4720 µL/kg; Dermal LD50 Rabbit >2000 mg/kg; Inhalation LC50 Rat 4.6 mg/L 4 h

Naphthalene (91-20-3)

Inhalation LC50 Rat >340 mg/m3 1 h; Oral LD50 Rat 490 mg/kg; Dermal LD50 Rat >2500 mg/kg; Dermal LD50 Rabbit >20 g/kg

Product Mixture

Oral LD50 Rat 14.5 ml/kg; Dermal LD50 Rabbit >5 mL/kg; Guinea Pig Sensitization: negative; Primary dermal irritation: moderately irritating (Draize mean irritation score - 3.98 rabbits); Draize eye irritation: mildly irritating (Draize score, 48 hours, unwashed - 2.0 rabbits)

Potential Health Effects: Skin Corrosion Property/Stimulativeness

Practically non-toxic if absorbed following acute (single) exposure. May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through the skin in toxic amounts if large areas of skin are repeatedly exposed.

Potential Health Effects: Eye Critical Damage/ Stimulativeness

Contact with eyes may cause mild irritation.

Potential Health Effects: Ingestion

Ingestion may cause gastrointestinal disturbances, including irritation, nausea, vomiting and diarrhea, and central nervous system (brain) effects similar to alcohol intoxication. In severe cases, tremors, convulsions, loss of consciousness, coma, respiratory arrest, and death may occur.

Potential Health Effects: Inhalation

Excessive exposure may cause irritations to the nose, throat, lungs and respiratory tract. Central nervous system (brain) effects may include headache, dizziness, loss of balance and coordination, unconsciousness, coma, respiratory failure, and death.

WARNING: the burning of any hydrocarbon as a fuel in an area without adequate ventilation may result in hazardous levels of combustion products, including carbon monoxide, and inadequate oxygen levels, which may cause unconsciousness, suffocation, and death.

Respiratory Organs Sensitization/Skin Sensitization

This product is not reported to have any skin sensitization effects.

Generative Cell Mutagenicity

This product is not reported to have any mutagenic effects. Material of similar composition has been positive in a mutagenicity study.

Carcinogenicity

A: General Product Information

Suspected of causing cancer.

Dermal carcinogenicity: positive - mice

Studies have shown that similar products produce skin tumors in laboratory animals following repeated applications without washing or removal. The significance of this finding to human exposure has not been determined. Other studies with active skin carcinogens have shown that washing the animal's skin with soap and water between applications reduced tumor formation.

This product is similar to Diesel Fuel. IARC classifies whole diesel fuel exhaust particulates as probably carcinogenic to humans (Group 2A) and NIOSH regards it as a potential cause of occupational lung cancer based on animal studies and limited evidence in humans.

B: Component Carcinogenicity

Fuel oil No. 2 (68476-30-2)

ACGIH: A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans (listed under Diesel fuel)

Naphthalene (91-20-3)

ACGIH: A4 - Not Classifiable as a Human Carcinogen
NTP: Reasonably Anticipated To Be A Human Carcinogen (Possible Select Carcinogen)
IARC: Monograph 82 [2002] (Group 2B (possibly carcinogenic to humans))

Reproductive Toxicity

This product is not reported to have any reproductive toxicity effects.

Specified Target Organ General Toxicity: Single Exposure

This product is not reported to have any specific target organ general toxicity single exposure effects.

Specified Target Organ General Toxicity: Repeated Exposure

This product is not reported to have any specific target organ general toxicity repeat exposure effects.

Aspiration Respiratory Organs Hazard

The major health threat of ingestion occurs from the danger of aspiration (breathing) of liquid drops into the lungs, particularly from vomiting. Aspiration may result in chemical pneumonia (fluid in the lungs), severe lung damage, respiratory failure and even death.

* * * Section 12 - Ecological Information * * *

Ecotoxicity

A: General Product Information

Very toxic to aquatic life with long lasting effects. Keep out of sewers, drainage areas and waterways. Report spills and releases, as applicable, under Federal and State regulations.

B: Component Analysis - Ecotoxicity - Aquatic Toxicity

Fuel oil No. 2 (68476-30-2)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	35 mg/L [flow-through]	

Naphthalene (91-20-3)

Test & Species		Conditions
96 Hr LC50 Pimephales promelas	5.74-6.44 mg/L [flow-through]	
96 Hr LC50 Oncorhynchus mykiss	1.6 mg/L [flow-through]	

96 Hr LC50 Oncorhynchus mykiss	0.91-2.82 mg/L [static]
96 Hr LC50 Pimephales promelas	1.99 mg/L [static]
96 Hr LC50 Lepomis macrochirus	31.0265 mg/L [static]
72 Hr EC50 Skeletonema costatum	0.4 mg/L
48 Hr LC50 Daphnia magna	2.16 mg/L
48 Hr EC50 Daphnia magna	1.96 mg/L [Flow through]
48 Hr EC50 Daphnia magna	1.09 - 3.4 mg/L [Static]

Persistence/Degradability
No information available.

Bioaccumulation
No information available.

Mobility in Soil
No information available.

* * * Section 13 - Disposal Considerations * * *

Waste Disposal Instructions
See Section 7 for Handling Procedures. See Section 8 for Personal Protective Equipment recommendations.

Disposal of Contaminated Containers or Packaging
Dispose of contents/container in accordance with local/regional/national/international regulations.

* * * Section 14 - Transportation Information * * *

IATA Information
Shipping Name: Heating oil, light
UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

ICAO Information
Shipping Name: Heating oil, light
UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

IMDG Information
Shipping Name: Heating oil, light
UN #: 1202 **Hazard Class:** 3 **Packing Group:** III

* * * Section 15 - Regulatory Information * * *

Regulatory Information

Component Analysis – Inventory

Component/CAS	EC #	EEC	CAN	TSCA
Fuel oil No. 2 68476-30-2	270-671-4	EINECS	DSL	Yes
Naphthalene 91-20-3	202-049-5	EINECS	DSL	Yes

* * * Section 16 - Other Information * * *

Key/Legend

ACGIH = American Conference of Governmental Industrial Hygienists; ADG = Australian Code for the Transport of Dangerous Goods by Road and Rail; ADR/RID = European Agreement of Dangerous Goods by Road/Rail; AS = Standards Australia; DFG = Deutsche Forschungsgemeinschaft; DOT = Department of Transportation; DSL = Domestic Substances List; EEC = European Economic Community; EINECS = European Inventory of Existing Commercial Chemical Substances; ELINCS = European List of Notified Chemical Substances; EU = European Union; HMIS = Hazardous Materials Identification System; IARC = International Agency for Research on Cancer; IMO = International Maritime Organization; IATA = International Air Transport Association; MAK = Maximum Concentration Value in the Workplace; NDSL = Non-Domestic Substances List; NFPA = National Fire Protection Association; NOHSC = National Occupational Health & Safety Commission; NTP = National Toxicology Program; STEL = Short-term Exposure Limit; TDG = Transportation of Dangerous Goods; TLV = Threshold Limit Value; TSCA = Toxic Substances Control Act; TWA = Time Weighted Average

Literature References

None

Other Information

Information presented herein has been compiled from sources considered to be dependable, and is accurate and reliable to the best of our knowledge and belief, but is not guaranteed to be so. Since conditions of use are beyond our control, we make no warranties, expressed or implied, except those that may be contained in our written contract of sale or acknowledgment.

Vendor assumes no responsibility for injury to vendee or third persons proximately caused by the material if reasonable safety procedures are not adhered to as stipulated in the data sheet. Additionally, vendor assumes no responsibility for injury to vendee or third persons proximately caused by abnormal use of the material, even if reasonable safety procedures are followed. Furthermore, vendee assumes the risk in their use of the material.

End of Sheet

SAFETY DATA SHEET

SDS ID NO.: 0127MAR019
Revision Date: 06/01/2016

1. IDENTIFICATION

Product Name: Marathon Petroleum Gasoline - All Grades

Synonym: Gasoline; Regular Unleaded Gasoline; Conventional Regular Unleaded Gasoline; Mid Grade Unleaded Gasoline; Conventional Mid Grade Unleaded Gasoline; Premium Unleaded Gasoline; Conventional Premium Unleaded Gasoline; Sub-Octane Gasoline; Regular RBOB; Super RBOB; Premium RBOB; RBOB; Reformulated Blend Stock For Oxygenated Blending; 84 Octane Gasoline; CBOB; Premium CBOB; Conventional Blend Stock for Oxygenate Blending; Recreational Gasoline; Recreational Gasoline; Recreational Unleaded Gasoline; 89 Recreational Gasoline; Brand 89 Recreational Gasoline; 7.0 Max RVP 89 Recreational Gasoline; BR 7.0 Max RVP 89 Recreational Gasoline; 90 Recreational Gasoline; 90 Marina Gasoline; Brand 91 Recreational Gasoline; 91 Recreational Gasoline; 91 Marina Gasoline; 90 Octane Midgrade Gasoline with No Ethanol; 0125MAR019; 0126MAR019; 0134MAR019; 0313MAR019; 0314MAR019

Chemical Family: Complex Hydrocarbon Substance

Recommended Use: Fuel.
Restrictions on Use: All others.

Manufacturer, Importer, or Responsible Party Name and Address:

MARATHON PETROLEUM COMPANY LP
539 South Main Street
Findlay, OH 45840

SDS information: 1-419-421-3070

Emergency Telephone: 1-877-627-5463

2. HAZARD IDENTIFICATION

Classification

OSHA Regulatory Status
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 1
Skin corrosion/irritation	Category 2
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1B
Reproductive toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Aspiration toxicity	Category 1
Acute aquatic toxicity	Category 2
Chronic aquatic toxicity	Category 2

Hazards Not Otherwise Classified (HNOC)

Static accumulating flammable liquid

Label elements

EMERGENCY OVERVIEW

Danger

EXTREMELY FLAMMABLE LIQUID AND VAPOR
May accumulate electrostatic charge and ignite or explode
May be fatal if swallowed and enters airways
Causes skin irritation
May cause respiratory irritation
May cause drowsiness or dizziness
May cause genetic defects
May cause cancer
Suspected of damaging fertility or the unborn child
Toxic to aquatic life with long lasting effects



Appearance Clear yellow liquid **Physical State** Liquid **Odor** Hydrocarbon

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools.
Take precautionary measures against static discharge
Avoid breathing mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear protective gloves/protective clothing/eye protection/face protection
Wash hands and any possibly exposed skin thoroughly after handling
Avoid release to the environment

Precautionary Statements - Response
IF exposed or concerned: Get medical attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
If skin irritation occurs: Get medical attention
Wash contaminated clothing before reuse
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor if you feel unwell
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Do NOT induce vomiting
In case of fire: Use water spray, fog or regular foam for extinction
Collect spillage

Precautionary Statements - Storage
Store in a well-ventilated place. Keep container tightly closed
Keep cool
Store locked up

Precautionary Statements - Disposal
Dispose of contents/container at an approved waste disposal plant

3. COMPOSITION/INFORMATION ON INGREDIENTS

Gasoline is a complex combination of hydrocarbons consisting of paraffins, cycloparaffins, aromatic and olefinic hydrocarbons having molecular chains ranging in length from four to ten carbons. May contain small amounts of dye and other additives (>0.02%) which are not considered hazardous at the concentrations used.

Composition Information:

Name	CAS Number	% Concentration
Gasoline	86290-81-5	100
Heptane (mixed isomers)	142-82-5	2.5-26
Pentane (mixed isomers)	78-78-4	6.5-19
Butane (mixed isomers)	106-97-8	0.5-14
Hexane Isomers (other than n-Hexane)	107-83-5	2-12
Toluene	108-88-3	3-9.5
Xylene (mixed isomers)	1330-20-7	3.5-9.5
n-Hexane	110-54-3	0.1-4.5
Cumene	98-82-8	0-4
1,2,4 Trimethylbenzene	95-63-6	1-4
Ethylbenzene	100-41-4	0.5-2.5
Benzene	71-43-2	0.1-1.5
Cyclohexane	110-82-7	0-1.5
Octane	111-65-9	0-1.5
1,2,3-trimethylbenzene	526-73-8	0-1
Naphthalene	91-20-3	0.1-0.5

All concentrations are percent by weight unless material is a gas. Gas concentrations are in percent by volume.

4. FIRST AID MEASURES

First Aid Measures

General Advice: In case of accident or if you feel unwell, seek medical advice immediately (show directions for use or safety data sheet if possible).

Inhalation: Remove to fresh air. If not breathing, institute rescue breathing. If breathing is difficult, ensure airway is clear, give oxygen and continue to monitor. If heart has stopped, immediately begin cardiopulmonary resuscitation (CPR). Keep affected person warm and at rest. If symptoms occur get medical attention.

Skin Contact: Immediately wash exposed skin with plenty of soap and water while removing contaminated clothing and shoes. May be absorbed through the skin in harmful amounts. Get medical attention if irritation persists. Any injection injury from high pressure equipment should be evaluated immediately by a physician as potentially serious (See NOTES TO PHYSICIAN).

Place contaminated clothing in closed container until cleaned or discarded. If clothing is to be laundered, inform the person performing the operation of contaminant's hazardous properties. Destroy contaminated, non-chemical resistant footwear.

Eye Contact: Flush immediately with large amounts of water for at least 15 minutes. Eyelids should be held away from the eyeball to ensure thorough rinsing. Gently remove contacts while flushing. Get medical attention if irritation persists.

Ingestion: Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips, or if patient is lying down, turn body and head to side to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. GET IMMEDIATE MEDICAL ATTENTION.

Most important signs and symptoms, both short-term and delayed with overexposure

Adverse Effects: Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Indication of any immediate medical attention and special treatment needed

Notes To Physician: INHALATION: This material (or a component) sensitizes the myocardium to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material. Administration of sympathomimetic drugs should be avoided.

SKIN: Leaks or accidents involving high-pressure equipment may inject a stream of material through the skin and initially produce an injury that may not appear serious. Only a small puncture wound may appear on the skin surface but, without proper treatment and depending on the nature, original pressure, volume, and location of the injected material, can compromise blood supply to an affected body part. Prompt surgical debridement of the wound may be necessary to prevent irreversible loss of function and/or the affected body part. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES.

INGESTION: This material represents a significant aspiration and chemical pneumonitis hazard. Induction of emesis is not recommended.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media
For small fires, Class B fire extinguishing media such as CO2, dry chemical, foam (AFFF/ATC) or water spray can be used. For large fires, water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Unsuitable extinguishing media
Do not use straight water streams to avoid spreading fire.

Specific hazards arising from the chemical
This product has been determined to be an extremely flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. May accumulate electrostatic charge and ignite or explode. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge, or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire related information, see NFPA 30 or the Emergency Response Guidebook 128.

Hazardous combustion products
Smoke, carbon monoxide, and other products of incomplete combustion.

Explosion data
Sensitivity to Mechanical Impact No.
Sensitivity to Static Discharge Yes.

Special protective equipment and precautions for firefighters
Firefighters should wear full protective clothing and positive-pressure self-contained breathing apparatus (SCBA) with a full face-piece, as appropriate. Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires, but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep run-off water out of sewers and water sources.

Additional firefighting tactics
FIRES INVOLVING TANKS OR CAR/TRAILER LOADS: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after the fire is out. Do not direct water at source of leak or safety devices; icing may occur. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles: if this is impossible, withdraw from area and let fire burn.

EVACUATION: Consider initial downwind evacuation for at least 1000 feet. If tank, rail car or tank truck is involved in a fire, ISOLATE for 5280 feet (1 mile) in all directions; also, consider initial evacuation of 5280 feet (1 mile) in all directions.

NFPA	Health 1	Flammability 3	Instability 0	Special Hazard -

6. ACCIDENTAL RELEASE MEASURES

Personal precautions:	Keep public away. Isolate and evacuate area. Shut off source if safe to do so. Eliminate all ignition sources.
Protective equipment:	Use personal protection measures as recommended in Section 8.
Emergency procedures:	Advise authorities and National Response Center (800-424-8802) if the product has entered a water course or sewer. Notify local health and pollution control agencies, if appropriate.
Environmental precautions:	Avoid release to the environment. Avoid subsoil penetration. Ethanol in gasoline phase seperates in contact with water. Monitor downstream for dissolved ethanol or other appropriate indicators.
Methods and materials for containment:	Contain liquid with sand or soil. Prevent spilled material from entering storm drains, sewers, and open waterways.
Methods and materials for cleaning up:	Use suitable absorbent materials such as vermiculite, sand, or clay to clean up residual liquids. Recover and return free product to proper containers. When recovering free liquids ensure all equipment is grounded and bonded. Use only non-sparking tools.

7. HANDLING AND STORAGE

Safe Handling Precautions:

NEVER SIPHON THIS PRODUCT BY MOUTH. Use appropriate grounding and bonding practices. Static accumulating flammable liquid. Bonding and grounding may be insufficient to eliminate the hazard from static electricity. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. Vapors may travel along the ground or be moved by ventilation. Flashback may occur along vapor trails. No smoking. Use only non-sparking tools. Avoid contact with skin, eyes and clothing. Avoid breathing fumes, gas, or vapors. Use only with adequate ventilation. Avoid repeated and prolonged skin contact. Use personal protection measures as recommended in Section 8. Exercise good personal hygiene including removal of soiled clothing and prompt washing with soap and water. Do not cut, drill, grind or weld on empty containers since explosive residues may remain. Refer to applicable EPA, OSHA, NFPA and consistent state and local requirements.

Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering, pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure, or sudden ingress of air into vacuum equipment may result in ignition of vapors or mists without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation.

Portable containers should never be filled while in or on a motor vehicle or marine craft. Containers should be placed on the ground. Static electric discharge can ignite fuel vapors when filling non-grounded containers or vehicles on trailers. The nozzle spout must be kept in contact with the container before and during the entire filling operation. Use only approved containers.

A buildup of static electricity can occur upon re-entry into a vehicle during fueling especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (i.e., clothing and upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while refueling.

Cellular phones and other electronic devices may have the potential to emit electrical charges (sparks). Sparks in potentially explosive atmospheres (including fueling areas such as gas stations) could cause an explosion if sufficient flammable vapors are present. Therefore, turn off cellular phones and other electronic devices when working in potentially explosive atmospheres or keep devices inside your vehicle during refueling.

High-pressure injection of any material through the skin is a serious medical emergency even though the small entrance wound at the injection site may not initially appear serious. These injection injuries can occur from high-pressure equipment such as paint spray or grease or guns, fuel injectors, or pinhole leaks in hoses or hydraulic lines and should all be considered serious. High pressure injection injuries may be SERIOUS SURGICAL EMERGENCIES (See First Aid Section 4).

Storage Conditions:

Store in properly closed containers that are appropriately labeled and in a cool, well-ventilated area. Do not store near an open flame, heat or other sources of ignition.

Incompatible Materials

Strong oxidizing agents.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Name	ACGIH TLV	OSHA PELS:	OSHA - Vacated PELs	NIOSH IDLH
Gasoline 86290-81-5	300 ppm TWA 500 ppm STEL	-	300 ppm TWA 900 mg/m^3 TWA 500 ppm STEL 1500 mg/m^3 STEL	-

Heptane (mixed isomers) 142-82-5	400 ppm TWA 500 ppm STEL	TWA: 500 ppm TWA: 2000 mg/m³	400 ppm TWA 1600 mg/m³ TWA 500 ppm STEL 2000 mg/m³ STEL	750 ppm
Pentane (mixed isomers) 78-78-4	1000 ppm TWA	-	-	-
Butane (mixed isomers) 106-97-8	1000 ppm STEL	-	800 ppm TWA 1900 mg/m³ TWA	-
Hexane Isomers (other than n-Hexane) 107-83-5	500 ppm TWA 1000 ppm STEL	-	500 ppm TWA 1800 mg/m³ TWA 1000 ppm STEL 3600 mg/m³ STEL	-
Toluene 108-88-3	20 ppm TWA	TWA: 200 ppm Ceiling: 300 ppm	100 ppm TWA 375 mg/m³ TWA 150 ppm STEL 560 mg/m³ STEL	500 ppm
Xylene (mixed isomers) 1330-20-7	100 ppm TWA 150 ppm STEL	TWA: 100 ppm TWA: 435 mg/m³	100 ppm TWA 435 mg/m³ TWA 150 ppm STEL 655 mg/m³ STEL	900 ppm
n-Hexane 110-54-3	50 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 500 ppm TWA: 1800 mg/m³	50 ppm TWA 180 mg/m³ TWA	1100 ppm
Cumene 98-82-8	50 ppm TWA	TWA: 50 ppm TWA: 245 mg/m³ Skin	50 ppm TWA 245 mg/m³ TWA Limit applies to skin	900 ppm
1,2,4 Trimethylbenzene 95-63-6	25 ppm TWA	-	25 ppm TWA 125 mg/m³ TWA	-
Ethylbenzene 100-41-4	20 ppm TWA	TWA: 100 ppm TWA: 435 mg/m³	100 ppm TWA 435 mg/m³ TWA 125 ppm STEL 545 mg/m³ STEL	800 ppm
Benzene 71-43-2	0.5 ppm TWA 2.5 ppm STEL Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm (applies to industry segments exempt from the benzene standard) TWA: 1 ppm STEL: 5 ppm (see 29 CFR 1910.1028)	25 ppm Ceiling 1 ppm TWA 5 ppm STEL	500 ppm
Cyclohexane 110-82-7	100 ppm TWA	TWA: 300 ppm TWA: 1050 mg/m³	300 ppm TWA 1050 mg/m³ TWA	1300 ppm
Octane 111-65-9	300 ppm TWA	TWA: 500 ppm TWA: 2350 mg/m³	300 ppm TWA 1450 mg/m³ TWA 375 ppm STEL 1800 mg/m³ STEL	1000 ppm
1,2,3-trimethylbenzene 526-73-8	25 ppm TWA	-	25 ppm TWA 125 mg/m³ TWA	-
Naphthalene 91-20-3	10 ppm TWA Skin - potential significant contribution to overall exposure by the cutaneous route	TWA: 10 ppm TWA: 50 mg/m³	10 ppm TWA 50 mg/m³ TWA 15 ppm STEL 75 mg/m³ STEL	250 ppm

Notes: The manufacturer has voluntarily elected to provide exposure limits contained in OSHA's 1989 air contaminants standard in its SDSs, even though certain of those exposure limits were vacated in 1992.

Engineering measures: Local or general exhaust required in an enclosed area or when there is inadequate ventilation. Use mechanical ventilation equipment that is explosion-proof.

Personal protective equipment

Eye protection: Use goggles or face-shield if the potential for splashing exists.

Skin and body protection: Use nitrile rubber, Viton® or PVA gloves for repeated or prolonged skin exposure. Glove suitability is based on workplace conditions and usage. Contact the glove manufacturer for specific advice on glove selection and breakthrough times.

Respiratory protection: Use a NIOSH approved organic vapor chemical cartridge or supplied air respirators when there is the potential for airborne exposures to exceed permissible exposure limits or if excessive vapors are generated. Observe respirator assigned protection factors (APFs) criteria cited in federal OSHA 29 CFR 1910.134. Self-contained breathing apparatus should be used for fire fighting.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical State	Liquid
Appearance	Clear yellow liquid
Color	Yellow
Odor	Hydrocarbon
Odor Threshold	No data available.

Property	**Values (Method)**
Melting Point / Freezing Point	No data available.
Initial Boiling Point / Boiling Range	24-210 °C / 75-410 °F (ASTM D86)
Flash Point	-43 °C / -45 °F
Evaporation Rate	No data available.
Flammability (solid, gas)	Not applicable.
Flammability Limit in Air (%):	
Upper Flammability Limit:	7.6
Lower Flammability Limit:	1.4
Explosion limits:	No data available.
Vapor Pressure	5.5-15 psi (ASTM D4814)
Vapor Density	3-4
Specific Gravity / Relative Density	0.70-0.76
Water Solubility	No data available.
Solubility in other solvents	No data available.
Partition Coefficient	2.13-4.5
Decomposition temperature	No data available.
pH:	Not applicable
Autoignition Temperature	280 °C / 536 °F
Kinematic Viscosity	No data available.
Dynamic Viscosity	No data available.
Explosive Properties	No data available.
VOC Content (%)	100%
Density	No data available.
Bulk Density	Not applicable.

10. STABILITY AND REACTIVITY

Reactivity The product is non-reactive under normal conditions.

Chemical stability The material is stable at 70°F, 760 mmHg pressure.

Possibility of hazardous reactions None under normal processing.

Hazardous polymerization Will not occur.

Conditions to avoid Excessive heat, sources of ignition, open flame.

Incompatible Materials Strong oxidizing agents.

Hazardous decomposition products None known under normal conditions of use.

11. TOXICOLOGICAL INFORMATION

Potential short-term adverse effects from overexposures

Inhalation May cause irritation of respiratory tract. May cause drowsiness or dizziness. Breathing high concentrations of this material in a confined space or by intentional abuse can cause irregular heartbeats which can cause death.

Eye contact Exposure to vapor or contact with liquid may cause mild eye irritation, including tearing, stinging, and redness.

Skin contact Causes skin irritation. Effects may become more serious with repeated or prolonged contact. May be absorbed through the skin in harmful amounts.

Ingestion May be fatal if swallowed or vomited and enters airways. May cause irritation of the mouth, throat and gastrointestinal tract.

Acute toxicological data

Name	Oral LD50	Dermal LD50	Inhalation LC50
Gasoline 86290-81-5	14000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.2 mg/L (Rat) 4 h
Heptane (mixed isomers) 142-82-5	-	3000 mg/kg (Rabbit)	103 g/m³ (Rat) 4 h
Pentane (mixed isomers) 78-78-4	-	-	450 mg/L (Mouse) 2 h
Butane (mixed isomers) 106-97-8	-	-	658 mg/L (Rat) 4 h
Hexane Isomers (other than n-Hexane) 107-83-5	> 5000 mg/kg (Rat)	-	-
Toluene 108-88-3	> 2000 mg/kg (Rat)	8390 mg/kg (Rabbit)	12.5 mg/L (Rat) 4 h
Xylene (mixed isomers) 1330-20-7	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 5.04 mg/L (Rat) 4 h
n-Hexane 110-54-3	15000 mg/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h
Cumene 98-82-8	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 20 mg/L (Rat) 6 h
1,2,4 Trimethylbenzene 95-63-6	3280 mg/kg (Rat)	> 3160 mg/kg (Rabbit)	18,000 mg/m³ (Rat) 4 h
Ethylbenzene 100-41-4	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	17.2 mg/L (Rat) 4 h
Benzene 71-43-2	> 2000 mg/kg (Rat)	> 5000 mg/kg (Rabbit)	> 20 mg/l (Rat) 4 h
Cyclohexane 110-82-7	> 5000 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	13.9 mg/L (Rat) 4 h
Octane 111-65-9	-	-	118 g/m³ (Rat) 4 h
1,2,3-trimethylbenzene 526-73-8	-	-	-
Naphthalene 91-20-3	490 mg/kg (Rat)	> 2000 mg/kg (Rabbit)	> 340 mg/m³ (Rat) 1 h

Delayed and immediate effects as well as chronic effects from short and long-term exposure

NAPHTHAS: In a large epidemiological study on over 15,000 employees at several petroleum refineries and amongst residents located near these refineries, no increased risk of kidney cancer was observed in association with gasoline exposures (a similar material). In a similar study, no increased risk of kidney cancer was observed among petroleum refinery workers, but there was a slight trend in the incidence of kidney cancers among service station employees, especially after a 30-year latency period. Altered mental state, drowsiness, peripheral motor neuropathy, irreversible brain damage (so-called Petrol Sniffer's Encephalopathy), delirium, seizures, and sudden death have been reported from repeated overexposure to some hydrocarbon solvents, naphthas, and gasoline.

ISOPARAFFINS: Studies in laboratory animals have shown that long-term exposure to similar materials (isoparaffins) can cause kidney damage and kidney cancer in male laboratory rats. However, in-depth research indicates that these findings are unique to the male rat, and that these effects are not relevant to humans.

C9 AROMATIC HYDROCARBONS: A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm.

PENTANES: Studies of pentane isomers in laboratory animals indicate exposure to extremely high levels (roughly 10 vol.%) may induce cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

BUTANES: Studies in laboratory animals indicate exposure to extremely high levels of butanes (1-10 or higher vol.% in air) may cause cardiac arrhythmias (irregular heartbeats) which may be serious or fatal.

TOLUENE: Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Abuse of toluene at high concentrations (e.g., glue sniffing and solvent abuse) has been associated with adverse effects on the liver, kidney and nervous system, and can cause CNS depression, cardiac arrhythmias, and death. Studies of workers indicate longterm exposure may be related to impaired color vision and hearing. Some studies of workers suggest longterm exposure may be related to neurobehavioral and cognitive changes. Some of these effects have been observed in laboratory animals following repeated exposure to high levels of toluene. Several studies of workers suggest longterm exposure may be related to small increases in spontaneous abortions and changes in some gonadotropic hormones. However, the weight of evidence does not indicate toluene is a reproductive hazard to humans. Studies in laboratory animals indicate some changes in reproductive organs following high levels of exposure, but no significant effects on mating performance or reproduction were observed. Case studies of persons abusing toluene suggest isolated incidences of adverse effects on the fetus including birth defects. Findings in laboratory animals have been largely negative. Positive findings include small increases in minor skeletal and visceral malformations and developmental delays following very high levels of maternal exposure. Studies of workers indicate long-term exposure may be related to effects on the liver, kidney and blood, but these appear to be limited to changes in serum enzymes and decreased leukocyte counts. Adverse effects on the liver, kidney, thymus and nervous system were observed in animal studies following very high levels of exposure. The relevance of these findings to humans is not clear at this time.

XYLENES, ALL ISOMERS: Overexposure to xylene may cause upper respiratory tract irritation, headache, cyanosis, blood serum changes, nervous system damage and narcosis. Effects may be increased by the use of alcoholic beverages. Evidence of liver and kidney impairment were reported in workers recovering from a gross overexposure. Effects from Prolonged or Repeated Exposure: Impaired neurological function was reported

in workers exposed to solvents including xylene. Studies in laboratory animals have shown evidence of impaired hearing following high levels of exposure. Studies in laboratory animals suggest some changes in reproductive organs following high levels of exposure but no significant effects on reproduction were observed. Studies in laboratory animals indicate skeletal and visceral malformations, developmental delays, and increased fetal resorptions following extremely high levels of maternal exposure with evidence of maternal toxicity. The relevance of these observations to humans is not clear at this time. Adverse effects on the liver, kidney, bone marrow (changes in blood cell parameters) were observed in laboratory animals following high levels of exposure. The relevance of these observations to humans is not clear at this time.

1,2,4-TRIMETHYLBENZENE: The following information pertains to a mixture of C9 aromatic hydrocarbons, over 40% of which was composed of 1,2,4-trimethylbenzene. A developmental inhalation study was conducted in laboratory mice. Increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate were observed at the highest exposure level (1,500 ppm). This exposure level was extremely toxic to pregnant female mice (44% mortality). Reduced fetal body weights were also observed at 500 ppm. A multi-generation reproduction inhalation study was conducted in laboratory rats. Reductions in pup weights, pup weight gain, litter size, and pup survival were observed at 1,500 ppm, an exposure level at which significant maternal toxicity was observed. Reduced pup weight gain was also observed at 500 ppm. Embryotoxicity has been reported in studies of laboratory animals. Adverse effects included increased implantation losses, reduced fetal weights, delayed ossification and an increased incidence of cleft palate.<n><n>

N-HEXANE: Long-term or repeated exposure to n-hexane can cause peripheral nerve damage. Initial symptoms are numbness of the fingers and toes. Also, motor weakness can occur in the digits, but may also involve muscles of the arms, thighs and forearms. The onset of these symptoms may be delayed for several months to a year after the beginning of exposure. Testicular atrophy and partial to full loss of the germ cell line were observed in sub-chronic high-dose inhalation studies of laboratory rodents. These effects appeared irreversible. Rodent reproduction studies have shown evidence of reduced fetal weight but no frank malformations.

CUMENE: Overexposure to cumene may cause upper respiratory tract irritation and CNS depression. Studies in laboratory animals indicate evidence of respiratory tract hyperplasia, and adverse effects on the liver, kidney and adrenal glands following high level exposure. The relevance of these findings to humans is not clear at this time. Findings from lifetime laboratory rodent inhalation studies were as follows: In F344/N rats: an increased incidence of renal carcinomas and adenomas, respiratory epithelial adenomas, and interstitial cell adenomas of the testes. In B6C3F1 mice: an increased incidence of carcinomas and adenomas of the bronchi and lung, liver neoplasms, hemangiosarcomas of the spleen, and adenomas of the thyroid.

ETHYLBENZENE: Findings from a 2-year inhalation study in rodents conducted by NTP were as follows: Effects were observed only at the highest exposure level (750 ppm). At this level the incidence of renal tumors was elevated in male rats (tubular carcinomas) and female rats (tubular adenomas). The incidence of tumors was also elevated in male mice (alveolar and bronchiolar carcinomas) and female mice (hepatocellular carcinomas). IARC has classified ethyl benzene as "possibly carcinogenic to humans" (Group 2B). Studies in laboratory animals indicate some evidence of post-implantation deaths following high levels of maternal exposure. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals indicate limited evidence of renal malformations, resorptions, and developmental delays following high levels of maternal exposure with evidence of maternal toxicity. The relevance of these findings to humans is not clear at this time. Studies in laboratory animals have demonstrated evidence of ototoxicity (hearing loss) following exposure levels as low as 300 ppm for 5 days. Studies in laboratory animals indicate some evidence of adverse effects on the liver, kidney, thyroid, and pituitary gland.

BENZENE: Studies of workers exposed to benzene show clear evidence that overexposure can cause cancer and other diseases of the blood forming organs including Acute

Myelogenous Leukemia (AML), and Aplastic Anemia (AA), an often fatal disease. Some studies suggest overexposure to benzene may also be associated with Myelodysplastic Syndrome (MDS). Findings from a case control study of workers exposed to benzene was reported during the 2009 Benzene Symposium in Munich included an increase in Acute Myeloid Leukemias and Non-Hodgkins Lymphoid Neoplasms (NHLN) of the subtype follicular lymphoma (FL) in some occupational categories. Some studies of workers exposed to benzene have shown an association with increased rates of chromosome aberrations in circulating lymphocytes. One study of women workers exposed to benzene suggested a weak association with irregular menstruation. However, other studies of workers exposed to benzene have not demonstrated clear evidence of an effect on fertility or reproductive outcome in humans. Benzene can cross the placenta and affect the developing fetus. Cases of AA have been reported in the offspring of persons severely overexposed to benzene. Studies in laboratory animals indicate that prolonged, repeated exposure to high levels of benzene vapor can cause bone marrow suppression and cancer in multiple organ systems. Studies in laboratory animals show evidence of adverse effects on male reproductive organs following high levels of exposure but no significant effects on reproduction have been observed. Embryotoxicity has been reported in studies of laboratory animals but effects were limited to reduced fetal weight and minor skeletal variations. Benzene has been classified as a proven human carcinogen by OSHA and a Group 1 (Carcinogenic to Humans) material by IARC. The current proposed IARC classification for benzene is summarized as follows: Sufficient evidence for Acute Myeloid Leukemia; limited evidence for Acute Lymphatic Leukemia, Chronic Lymphatic Leukemia, Non-Hodgkin Lymphoma, and Multiple Myeloma.

NAPHTHALENE: Severe jaundice, neurotoxicity (kernicterus) and fatalities have been reported in young children and infants as a result of hemolytic anemia from overexposure to naphthalene. Persons with glucose 6-phosphate dehydrogenase (G6PD) deficiency are more prone to the hemolytic effects of naphthalene. Adverse effects on the kidney have been reported in persons overexposed to naphthalene but these effects are believed to be a consequence of hemolytic anemia, and not a direct effect. Hemolytic anemia has been observed in laboratory animals exposed to naphthalene. Laboratory rodents exposed to naphthalene vapor for 2 years (lifetime studies) developed non-neoplastic and neoplastic tumors and inflammatory lesions of the nasal and respiratory tract. Cataracts and other adverse effects on the eye have been observed in laboratory animals exposed to high levels of naphthalene. Findings from a large number of bacterial and mammalian cell mutation assays have been negative. A few studies have shown chromosomal effects (elevated levels of Sister Chromatid Exchange or chromosomal aberrations) in vitro. Naphthalene has been classified as Possibly Carcinogenic to Humans (2B) by IARC, based on findings from studies in laboratory animals.

CARBON MONOXIDE: is a chemical asphyxiant with no warning properties (such as odor). At 400-500 ppm for 1 hour headache and dyspnea may occur. If activity is increased, symptoms of overexposure may include nausea, irritability, increased respiration, tinnitus, sweating, chest pain, confusion, impaired judgement, dizziness, weakness, drowsiness, ataxia, irregular heart beat, cyanosis and pallor. Levels in excess of 1000 ppm can result in collapse, loss of conciousness, respiratory failure and death. Extremely high concentrations (12,800 ppm) can cause immediate unconsciousness and death in 1-3 minutes. Repeated anoxia can lead to central nervous system damage and peripheral neuropathy, with loss of sensation in the fingers, amnesia, and mental deterioration and possible congestive heart failure. Damage may also occur to the fetus, lung, liver, kidney, spleen, cardiovascular system and other organs.

WHOLLY-VAPORIZED UNLEADED GASOLINE: Lifetime exposure to wholly vaporized unleaded gasoline produced an increased incidence of liver tumors in female mice exposed to the highest exposure concentration (2056 ppm) and α-2 urinary globulin-mediated kidney tumors in male rats. No exposure-related tumors were observed in male mice or female rats. The male-specific rat kidney tumors are not considered relevant to human health. Mice receiving lifetime repeated skin application of various petroleum naphthas exhibited an irritation-dependent increased incidence of skin tumors. Additional studies suggest that these tumors occur through a mechanism that may not be relevant to human health. Epidemiological data from over 18,000 petroleum marketing and distribution workers

showed no increased risk of leukemia, multiple myeloma, or kidney cancer resulting from gasoline exposure. Unleaded gasoline has been identified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

COMBUSTION ENGINE EXHAUST: Chronic inhalation studies of gasoline engine exhaust in mice, rats and hamsters did not produce any carcinogenic effects. Condensates/extracts of gasoline engine exhaust produced an increase in tumors compared to controls when testing by skin painting, subcutaneous injection, intratracheal instillation or implantation into the lungs. Gasoline exhaust has been classified as possibly carcinogenic to humans (2B) by the International Agency for Research on Cancer (IARC).

Adverse effects related to the physical, chemical and toxicological characteristics

Signs and Symptoms Irritating to the skin and mucous membranes. Symptoms may include redness, itching, and inflammation. May cause nausea, vomiting, diarrhea, and signs of nervous system depression: headache, drowsiness, dizziness, loss of coordination, disorientation and fatigue. Aspiration hazard. May cause coughing, chest pains, shortness of breath, pulmonary edema and/or chemical pneumonitis. Repeated or prolonged skin contact may cause drying, reddening, itching and cracking.

Sensitization Not expected to be a skin or respiratory sensitizer.

Mutagenic effects May cause genetic defects.

Carcinogenicity May cause cancer.

Cancer designations are listed in the table below

Name	ACGIH (Class)	IARC (Class)	NTP	OSHA
Gasoline 86290-81-5	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Heptane (mixed isomers) 142-82-5	Not Listed	Not Listed	Not Listed	Not Listed
Pentane (mixed isomers) 78-78-4	Not Listed	Not Listed	Not Listed	Not Listed
Butane (mixed isomers) 106-97-8	Not Listed	Not Listed	Not Listed	Not Listed
Hexane Isomers (other than n-Hexane) 107-83-5	Not Listed	Not Listed	Not Listed	Not Listed
Toluene 108-88-3	Not Classifiable (A4)	Not Classifiable (3)	Not Listed	Not Listed
Xylene (mixed isomers) 1330-20-7	Not classifiable (A4)	Not classifiable (3)	Not Listed	Not Listed
n-Hexane 110-54-3	Not Listed	Not Listed	Not Listed	Not Listed
Cumene 98-82-8	Not listed	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not listed
1,2,4 Trimethylbenzene 95-63-6	Not Listed	Not Listed	Not Listed	Not Listed
Ethylbenzene 100-41-4	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Not Listed	Not Listed
Benzene 71-43-2	Confirmed human carcinogen (A1)	Carcinogenic to humans (1)	Known to be human carcinogen	Known carcinogen
Cyclohexane 110-82-7	Not Listed	Not Listed	Not Listed	Not Listed
Octane 111-65-9	Not Listed	Not Listed	Not Listed	Not Listed
1,2,3-trimethylbenzene 526-73-8	Not Listed	Not Listed	Not Listed	Not Listed
Naphthalene 91-20-3	Confirmed animal carcinogen (A3)	Possible human carcinogen (2B)	Reasonably anticipated to be a human carcinogen	Not Listed

Reproductive toxicity Suspected of damaging fertility or the unborn child.

Specific Target Organ Toxicity (STOT) - single exposure Respiratory system. Central nervous system.

Specific Target Organ Toxicity (STOT) - repeated exposure Not classified.

Aspiration hazard May be fatal if swallowed or vomited and enters airways.

12. ECOLOGICAL INFORMATION

Ecotoxicity This product should be considered toxic to aquatic organisms, with the potential to cause long lasting adverse effects in the aquatic environment.

Name	Algae/aquatic plants	Fish	Toxicity to Microorganisms	Crustacea
Gasoline 86290-81-5	72-hr EC50 = 56 mg/l Algae	96-hr LC50 = 11 mg/l Rainbow trout (static)	-	48-hr LC50 = 7.6 mg/l Daphnia magna
Heptane (mixed isomers) 142-82-5	-	96-hr LC50 = 375 mg/L Tilapia	-	-
Pentane (mixed isomers) 78-78-4	-	96-hr LC50 = 3.1 mg/L Rainbow trout	-	48-hr EC50 = >1 - <10 mg/L Daphnia magna
Butane (mixed isomers) 106-97-8	-	-	-	-
Hexane Isomers (other than n-Hexane) 107-83-5	-	-	-	-
Toluene 108-88-3	72-hr EC50 = 12.5 mg/l Algae	96-hr LC50 <= 10 mg/l Rainbow trout	-	48-hr EC50 = 5.46-9.83 mg/l Daphnia magna 48-hr EC50 = 11.5 mg/l Daphnia magna (Static)
Xylene (mixed isomers) 1330-20-7	72-hr EC50 = 11 mg/l Algae	96-hr LC50 = 8 mg/l Rainbow trout	-	48-hr LC50 = 3.82 mg/l Daphnia magna
n-Hexane 110-54-3	-	96-hr LC50 = 2.5 mg/l Fathead minnow	-	-
Cumene 98-82-8	72-hr EC50 = 2.6 mg/l Algae	96-hr LC50 = 6.04-6.61 mg/l Fathead minnow (Flow-through) 96-hr LC50 = 2.7 mg/l Rainbow trout (semi-static)	-	48-hr EC50 = 7.9-14.1 mg/l Daphnia magna (static)
1,2,4 Trimethylbenzene 95-63-6	-	96-hr LC50 = 7.19-8.28 mg/l Fathead minnow (flow-through)	-	48-hr EC50 = 6.14 mg/L Daphnia magna
Ethylbenzene 100-41-4	72-hr EC50 = 1.7-7.6 mg/l Algae	96-hr LC50 = 4 mg/L Rainbow trout	-	48-hr EC50 = 1-4 mg/L Daphnia magna
Benzene 71-43-2	72-hr EC50 = 29 mg/l Algae	96-hr LC50 = 5.3 mg/l Rainbow trout (flow-through)	-	48-hr EC50 = 8.76-15.6 mg/l Daphnia magna (Static)
Cyclohexane 110-82-7	72-hr EC50 = 500 mg/l Algae	96-hr LC50 = 3.96-5.18 mg/l Fathead minnow	-	48-hr EC50 = 1.7-3.5 mg/L Bay shrimp
Octane 111-65-9	-	-	-	48-hr LC50 = 0.38 mg/l Daphnia magna
1,2,3-trimethylbenzene 526-73-8	-	96-hr LC50 = 7.72 mg/l Fathead Minnow (flow-through)	-	-
Naphthalene 91-20-3	-	96-hr LC50 = 0.91-2.82 mg/l Rainbow trout (static) 96-hr LC50 = 1.99 mg/l Fathead minnow (static)	-	48-hr LC50 = 1.6 mg/l Daphnia magna

Persistence and degradability Expected to be inherently biodegradable. The presence of ethanol in this product may impede the biodegradation of benzene, toluene, ethylbenzene and xylene in groundwater, resulting in elongated plumes of these constituents.

Bioaccumulation Has the potential to bioaccumulate.

Mobility in soil May partition into air, soil and water.

Other adverse effects No information available.

13. DISPOSAL CONSIDERATIONS

Description of Waste Residues
This material may be a flammable liquid waste.

Safe Handling of Wastes
Handle in accordance with applicable local, state, and federal regulations. Use personal protection measures as required. Use appropriate grounding and bonding practices. Use only non-sparking tools. Do not expose to heat, open flames, strong oxidizers or other sources of ignition. No smoking.

Disposal of Wastes / Methods of Disposal
The user is responsible for determining if any discarded material is a hazardous waste (40 CFR 262.11). Dispose of in accordance with federal, state and local regulations.

Methods of Contaminated Packaging Disposal
Empty containers should be completely drained and then discarded or recycled, if possible. Do not cut, drill, grind or weld on empty containers since explosive residues may be present. Dispose of in accordance with federal, state and local regulations.

14. TRANSPORT INFORMATION

DOT (49 CFR 172.101):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing Group:	II

TDG (Canada):

UN Proper Shipping Name:	Gasoline
UN/Identification No:	UN 1203
Transport Hazard Class(es):	3
Packing Group:	II

15. REGULATORY INFORMATION

US Federal Regulatory Information:

US TSCA Chemical Inventory Section 8(b): This product and/or its components are listed on the TSCA Chemical Inventory.

EPA Superfund Amendment & Reauthorization Act (SARA):

SARA Section 302: This product does not contain any component(s) included on EPA's Extremely Hazardous Substance (EHS) List.

Name	CERCLA/SARA - Section 302 Extremely Hazardous Substances and TPQs
Gasoline	NA
Heptane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Butane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA
Toluene	NA
Xylene (mixed isomers)	NA

n-Hexane	NA
Cumene	NA
1,2,4 Trimethylbenzene	NA
Ethylbenzene	NA
Benzene	NA
Cyclohexane	NA
Octane	NA
1,2,3-trimethylbenzene	NA
Naphthalene	NA

SARA Section 304: This product may contain component(s) identified either as an EHS or a CERCLA Hazardous substance which in case of a spill or release may be subject to SARA reporting requirements:

Name	Hazardous Substances RQs
Gasoline	NA
Heptane (mixed isomers)	NA
Pentane (mixed isomers)	NA
Butane (mixed isomers)	NA
Hexane Isomers (other than n-Hexane)	NA
Toluene	1000 lb final RQ 454 kg final RQ
Xylene (mixed isomers)	100 lb final RQ 45.4 kg final RQ
n-Hexane	5000 lb final RQ 2270 kg final RQ
Cumene	5000 lb final RQ 2270 kg final RQ
1,2,4 Trimethylbenzene	NA
Ethylbenzene	1000 lb final RQ 454 kg final RQ
Benzene	10 lb final RQ 4.54 kg final RQ
Cyclohexane	1000 lb final RQ 454 kg final RQ
Octane	NA
1,2,3-trimethylbenzene	NA
Naphthalene	100 lb final RQ 45.4 kg final RQ

SARA: The following EPA hazard categories apply to this product:

Acute Health Hazard
Chronic Health Hazard
Fire Hazard

SARA Section 313: This product may contain component(s), which if in exceedance of the de minimus threshold, may be subject to the reporting requirements of SARA Title III Section 313 Toxic Release Reporting (Form R).

Name	CERCLA/SARA 313 Emission reporting:
Gasoline	None
Heptane (mixed isomers)	None
Pentane (mixed isomers)	None
Butane (mixed isomers)	None
Hexane Isomers (other than n-Hexane)	None
Toluene	1.0 % de minimis concentration
Xylene (mixed isomers)	1.0 % de minimis concentration
n-Hexane	1.0 % de minimis concentration
Cumene	1.0 % de minimis concentration

1,2,4 Trimethylbenzene	1.0 % de minimis concentration
Ethylbenzene	0.1 % de minimis concentration
Benzene	0.1 % de minimis concentration
Cyclohexane	1.0 % de minimis concentration
Octane	None
1,2,3-trimethylbenzene	None
Naphthalene	0.1 % de minimis concentration

State and Community Right-To-Know Regulations:
The following component(s) of this material are identified on the regulatory lists below:

Gasoline

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0957
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0957 TPQ: 10000 lb (Under N.J.A.C. 7:1G, environmental hazardous substances in mixtures such as gasoline or new and used petroleum oil may be reported under these categories)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Heptane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1339
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Pentane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1064
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed

California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 1064 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Butane (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0273
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - fourth degree
New Jersey - Environmental Hazardous Substances List:	SN 0273 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Hexane Isomers (other than n-Hexane)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1285
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Not Listed
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Toluene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Developmental toxicity, initial date 1/1/91 Female reproductive toxicity, initial date 8/7/09
New Jersey Right-To-Know:	SN 1866
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed

New Jersey - Special Hazardous Substances:	Flammable - third degree; Teratogen
New Jersey - Environmental Hazardous Substances List:	SN 1866 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Xylene (mixed isomers)

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 2014
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold all isomers
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 2014 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

n-Hexane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1340
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 1340 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1 lb RQ (air); 1 lb RQ (land/water)

Cumene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/6/10
New Jersey Right-To-Know:	SN 0542
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin)
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0542 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present

New York - Reporting of Releases Part 597 - List of Hazardous Substances:	5000 lb RQ (air); 1 lb RQ (land/water)

1,2,4 Trimethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Ethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 6/11/04
New Jersey Right-To-Know:	SN 0851
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen; flammable - Third degree
New Jersey - Environmental Hazardous Substances List:	SN 0851 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Benzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 2/27/87 Developmental toxicity, initial date 12/26/97 Male reproductive toxicity, initial date 12/26/97
New Jersey Right-To-Know:	SN 0197
Pennsylvania Right-To-Know:	Environmental hazard; Special hazardous substance
Massachusetts Right-To Know:	Carcinogen; Extraordinarily hazardous
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic (skin); Flammable (skin); Carcinogen (skin)
Michigan Critical Materials Register List:	100 lb Annual usage threshold
Massachusetts Extraordinarily Hazardous Substances:	Carcinogen; Extraordinarily hazardous
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Present
New Jersey - Special Hazardous Substances:	Carcinogen; Flammable - third degree; Mutagen
New Jersey - Environmental Hazardous Substances List:	SN 0197 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	10 lb RQ (air); 1 lb RQ (land/water)

Cyclohexane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 0565
Pennsylvania Right-To-Know:	Environmental hazard
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	SN 0565 TPQ: 500 lb
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	1000 lb RQ (air); 1 lb RQ (land/water)

Octane

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1434
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Flammable - third degree
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Not Listed
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

1,2,3-trimethylbenzene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Not Listed
New Jersey Right-To-Know:	SN 1929
Pennsylvania Right-To-Know:	Present
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Not Listed
New Jersey - Environmental Hazardous Substances List:	Not Listed
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	Not Listed

Naphthalene

Louisiana Right-To-Know:	Not Listed
California Proposition 65:	Carcinogen, initial date 4/19/02
New Jersey Right-To-Know:	SN 1322 SN 3758

Pennsylvania Right-To-Know:	Environmental hazard Present (particulate)
Massachusetts Right-To Know:	Present
Florida Substance List:	Not Listed
Rhode Island Right-To-Know:	Toxic; Flammable
Michigan Critical Materials Register List:	Not Listed
Massachusetts Extraordinarily Hazardous Substances:	Not Listed
California - Regulated Carcinogens:	Not Listed
Pennsylvania RTK - Special Hazardous Substances:	Not Listed
New Jersey - Special Hazardous Substances:	Carcinogen
New Jersey - Environmental Hazardous Substances List:	SN 1322 TPQ: 500 lb (Reportable at the de minimis quantity of >0.1%)
Illinois - Toxic Air Contaminants:	Present
New York - Reporting of Releases Part 597 - List of Hazardous Substances:	100 lb RQ (air); 1 lb RQ (land/water)

Canada DSL/NDSL Inventory: This product and/or its components are listed either on the Domestic Substances List (DSL) or are exempt.

Canadian Regulatory Information: This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the (M)SDS contains all the information required by the Controlled Products Regulations.

Name	Canada - WHMIS: Classifications of Substances:	Canada - WHMIS: Ingredient Disclosure:
Gasoline	B2,D2A,D2B	0.1%
Heptane (mixed isomers)	B2,D2B	1%
Pentane (mixed isomers)	B2	1%
Butane (mixed isomers)	A,B1	1%
Hexane Isomers (other than n-Hexane)	B2	1%
Toluene	B2,D2A,D2B	0.1%
Xylene (mixed isomers)	B2,D2A,D2B	m-, o-isomers 1.0%; p-isomer 0.1%
n-Hexane	B2,D2A,D2B	1%
Cumene	B2,D2A	0.1%
1,2,4 Trimethylbenzene	B3,D2B	1%
Ethylbenzene	B2,D2A,D2B	0.1%
Benzene	B2,D2A,D2B	0.1%
Cyclohexane	B2,D2B	1%
Octane	B2,D2B	1%
1,2,3-trimethylbenzene	B3	1%
Naphthalene	B4,D2A	0.1%



Note: Not applicable.

16. OTHER INFORMATION

Prepared By Toxicology and Product Safety

Revision Date: 06/01/2016

Revision Note:

Revised Sections

The following sections (§) have been updated:
1. IDENTIFICATION
2. HAZARD IDENTIFICATION
3. COMPOSITION/INFORMATION ON INGREDIENTS
4. FIRST AID MEASURES
6. ACCIDENTAL RELEASE MEASURES
7. HANDLING AND STORAGE
8. EXPOSURE CONTROLS/PERSONAL PROTECTION
9. PHYSICAL AND CHEMICAL PROPERTIES
11. TOXICOLOGICAL INFORMATION
12. ECOLOGICAL INFORMATION
15. REGULATORY INFORMATION

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is intended as guidance for safe handling, use, processing, storage, transportation, accidental release, clean-up and disposal and is not considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

SAFETY DATA SHEET

Helium

Section 1. Identification

GHS product identifier : Helium

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

Product use : Synthetic/Analytical chemistry.

Synonym : helium (dot); Helium-4; He; o-Helium; UN 1046

SDS # : 001025

Supplier's details : Airgas USA, LLC and its affiliates
259 North Radnor-Chester Road
Suite 100
Radnor, PA 19087-5283
1-610-687-5253

Emergency telephone number (with hours of operation) : 1-866-734-3438

Section 2. Hazards identification

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Classification of the substance or mixture : GASES UNDER PRESSURE - Compressed gas

GHS label elements

Hazard pictograms :



Signal word : Warning

Hazard statements : Contains gas under pressure; may explode if heated.
May displace oxygen and cause rapid suffocation.

Precautionary statements

General : Read and follow all Safety Data Sheets (SDS'S) before use. Read label before use. Keep out of reach of children. If medical advice is needed, have product container or label at hand. Close valve after each use and when empty. Use equipment rated for cylinder pressure. Do not open valve until connected to equipment prepared for use. Use a back flow preventative device in the piping. Use only equipment of compatible materials of construction.

Prevention : Use and store only outdoors or in a well ventilated place.

Response : Not applicable.

Storage : Protect from sunlight. Protect from sunlight when ambient temperature exceeds 52°C/125°F. Store in a well-ventilated place.

Disposal : Not applicable.

Hazards not otherwise classified : In addition to any other important health or physical hazards, this product may displace oxygen and cause rapid suffocation.

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Section 3. Composition/information on ingredients

Substance/mixture : Substance

Chemical name : Helium

Other means of identification : helium (dot); Helium-4; He; o-Helium; UN 1046

CAS number/other identifiers

CAS number : 7440-59-7

Product code : 001025

Ingredient name	%	CAS number
Helium	100	7440-59-7

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Occupational exposure limits, if available, are listed in Section 8.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Get medical attention if adverse health effects persist or are severe. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur. Wash clothing before reuse. Clean shoes thoroughly before reuse.

Ingestion : As this product is a gas, refer to the inhalation section.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Frostbite : Try to warm up the frozen tissues and seek medical attention.

Ingestion : As this product is a gas, refer to the inhalation section.

Over-exposure signs/symptoms

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Powered by IHS

Section 4. First aid measures

Specific treatments : No specific treatment.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : Contains gas under pressure. In a fire or if heated, a pressure increase will occur and the container may burst or explode.

Hazardous thermal decomposition products : No specific data.

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Contact supplier immediately for specialist advice. Move containers from fire area if this can be done without risk. Use water spray to keep fire-exposed containers cool.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Avoid breathing gas. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Ensure emergency procedures to deal with accidental gas releases are in place to avoid contamination of the environment. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Immediately contact emergency personnel. Stop leak if without risk.

Large spill : Immediately contact emergency personnel. Stop leak if without risk. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

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Section 7. Handling and storage

Precautions for safe handling

Protective measures : Put on appropriate personal protective equipment (see Section 8). Contains gas under pressure. Avoid contact with eyes, skin and clothing. Avoid breathing gas. Empty containers retain product residue and can be hazardous. Do not puncture or incinerate container. Use equipment rated for cylinder pressure. Close valve after each use and when empty. Protect cylinders from physical damage; do not drag, roll, slide, or drop. Use a suitable hand truck for cylinder movement.

Advice on general occupational hygiene : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

Conditions for safe storage, including any incompatibilities : Store in accordance with local regulations. Store in a segregated and approved area. Store away from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10). Keep container tightly closed and sealed until ready for use. Cylinders should be stored upright, with valve protection cap in place, and firmly secured to prevent falling or being knocked over. Cylinder temperatures should not exceed 52 °C (125 °F).

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

Ingredient name	Exposure limits
Helium	Oxygen Depletion [Asphyxiant]

Appropriate engineering controls : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

Hygiene measures : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

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Section 8. Exposure controls/personal protection

Hand protection : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.

Body protection : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

Physical state : Gas. [Compressed gas.]

Color : Colorless.

Molecular weight : 4 g/mole

Molecular formula : He

Boiling/condensation point : -268.9°C (-452°F)

Melting/freezing point : -272.2°C (-458°F)

Critical temperature : -267.9°C (-450.2°F)

Odor : Odorless.

Odor threshold : Not available.

pH : Not available.

Flash point : [Product does not sustain combustion.]

Burning time : Not applicable.

Burning rate : Not applicable.

Evaporation rate : Not available.

Flammability (solid, gas) : Not available.

Lower and upper explosive (flammable) limits : Not available.

Vapor pressure : Not available.

Vapor density : 0.14 (Air = 1) Liquid Density@BP: 7.8 lb/ft3 (125 kg/m3)

Specific Volume (ft ^{3}/lb) : 96.1538

Gas Density (lb/ft ^{3}) : 0.0104

Relative density : Not applicable.

Solubility : Not available.

Solubility in water : Not available.

Partition coefficient: n-octanol/water : 0.28

Auto-ignition temperature : Not available.

Decomposition temperature : Not available.

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Section 9. Physical and chemical properties

SADT : Not available.

Viscosity : Not applicable.

Section 10. Stability and reactivity

Reactivity : No specific test data related to reactivity available for this product or its ingredients.

Chemical stability : The product is stable.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

Conditions to avoid : No specific data.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Hazardous polymerization : Under normal conditions of storage and use, hazardous polymerization will not occur.

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Not available.

Carcinogenicity

Not available.

Reproductive toxicity

Not available.

Teratogenicity

Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

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Section 11. Toxicological information

Information on the likely routes of exposure : Not available.

Potential acute health effects

Eye contact : Contact with rapidly expanding gas may cause burns or frostbite.

Inhalation : No known significant effects or critical hazards.

Skin contact : Contact with rapidly expanding gas may cause burns or frostbite.

Ingestion : As this product is a gas, refer to the inhalation section.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact : No specific data.

Inhalation : No specific data.

Skin contact : No specific data.

Ingestion : No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Not available.

General : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

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Section 12. Ecological information

Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Helium	0.28	-	low

Mobility in soil

Soil/water partition coefficient (K_{OC}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Empty Airgas-owned pressure vessels should be returned to Airgas. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Do not puncture or incinerate container.

Section 14. Transport information

	DOT	TDG	Mexico	IMDG	IATA
UN number	UN1046	UN1046	UN1046	UN1046	UN1046
UN proper shipping name	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED	HELIUM, COMPRESSED
Transport hazard class(es)	2.2 	2.2 	2.2 	2.2 	2.2 
Packing group	-	-	-	-	-
Environment	No.	No.	No.	No.	No.
Additional information	**Limited quantity** Yes. **Packaging instruction** **Passenger aircraft** Quantity limitation: 75 kg **Cargo aircraft** Quantity limitation: 150 kg	**Explosive Limit and Limited Quantity Index** 0.125 **Passenger Carrying Road or Rail Index** 75	-	-	**Passenger and Cargo Aircraft**Quantity limitation: 75 kg **Cargo Aircraft Only** Quantity limitation: 150 kg

"Refer to CFR 49 (or authority having jurisdiction) to determine the information required for shipment of the product."

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Section 14. Transport information

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **TSCA 8(a) CDR Exempt/Partial exemption**: Not determined

United States inventory (TSCA 8b): This material is listed or exempted.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Sudden release of pressure

Composition/information on ingredients

Name	%	Fire hazard	Sudden release of pressure	Reactive	Immediate (acute) health hazard	Delayed (chronic) health hazard
Helium	100	No.	Yes.	No.	No.	No.

State regulations

Massachusetts : This material is listed.

New York : This material is not listed.

New Jersey : This material is listed.

Pennsylvania : This material is listed.

Canada inventory : This material is listed or exempted.

International regulations

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Section 15. Regulatory information

International lists : **Australia inventory (AICS)**: This material is listed or exempted.
China inventory (IECSC): This material is listed or exempted.
Japan inventory: Not determined.
Korea inventory: This material is listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): This material is listed or exempted.
Philippines inventory (PICCS): This material is listed or exempted.
Taiwan inventory (CSNN): Not determined.

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

Chemical Weapons Convention List Schedule III Chemicals : Not listed

Canada

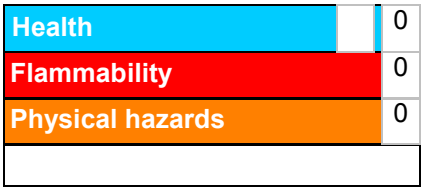
WHMIS (Canada) : Class A: Compressed gas.

CEPA Toxic substances: This material is not listed.
Canadian ARET: This material is not listed.
Canadian NPRI: This material is not listed.
Alberta Designated Substances: This material is not listed.
Ontario Designated Substances: This material is not listed.
Quebec Designated Substances: This material is not listed.

Section 16. Other information

Canada Label requirements : Class A: Compressed gas.

Hazardous Material Information System (U.S.A.)



Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks Although HMIS® ratings are not required on SDSs under 29 CFR 1910. 1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



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Section 16. Other information

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

History

Date of printing : 10/15/2014.

Date of issue/Date of revision : 10/15/2014.

Date of previous issue : 10/2/2014.

Version : 0.02

Key to abbreviations : ATE = Acute Toxicity Estimate
BCF = Bioconcentration Factor
GHS = Globally Harmonized System of Classification and Labelling of Chemicals
IATA = International Air Transport Association
IBC = Intermediate Bulk Container
IMDG = International Maritime Dangerous Goods
LogPow = logarithm of the octanol/water partition coefficient
MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution)
UN = United NationsACGIH – American Conference of Governmental Industrial Hygienists
AIHA – American Industrial Hygiene Association
CAS – Chemical Abstract Services
CEPA – Canadian Environmental Protection Act
CERCLA – Comprehensive Environmental Response, Compensation, and Liability Act (EPA)
CFR – United States Code of Federal Regulations
CPR – Controlled Products Regulations
DSL – Domestic Substances List
GWP – Global Warming Potential
IARC – International Agency for Research on Cancer
ICAO – International Civil Aviation Organisation
Inh – Inhalation
LC – Lethal concentration
LD – Lethal dosage
NDSL – Non-Domestic Substances List
NIOSH – National Institute for Occupational Safety and Health
TDG – Canadian Transportation of Dangerous Goods Act and Regulations
TLV – Threshold Limit Value
TSCA – Toxic Substances Control Act
WEEL – Workplace Environmental Exposure Level
WHMIS – Canadian Workplace Hazardous Material Information System

References : Not available.

Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.

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SAFETY DATA SHEET

Version 5.6
Revision Date 04/24/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Heptachlor

Product Number : PS78
Brand : Supelco
Index-No. : 602-046-00-2

CAS-No. : 76-44-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Dermal (Category 2), H310
Carcinogenicity (Category 2), H351
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H300 + H310 Fatal if swallowed or in contact with skin
H351 Suspected of causing cancer.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P262	Do not get in eyes, on skin, or on clothing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P302 + P350	IF ON SKIN: Gently wash with plenty of soap and water.
P310	Immediately call a POISON CENTER or doctor/ physician.
P322	Specific measures (see supplemental first aid instructions on this label).
P330	Rinse mouth.
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,4,5,6,7,8,8-Heptachloro-3a,4,7,7a-tetrahydro-4,7-methanoindene
Formula	:	$C_{10}H_5Cl_7$
Molecular weight	:	373.32 g/mol
CAS-No.	:	76-44-8
EC-No.	:	200-962-3
Index-No.	:	602-046-00-2

Hazardous components

Component	Classification	Concentration
Heptachlor		
	Acute Tox. 2; Carc. 2; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H300 + H310, H351, H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Heptachlor	76-44-8	TWA	0.050000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Skin contact does contribute to exposure. Confirmed animal carcinogen with unknown relevance to humans		
		TWA	0.5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		

		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		TWA	0.500000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A Potential for dermal absorption		
		TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 40.0 mg/kg

Inhalation: No data available

LD50 Dermal - Rat - 119.0 mg/kg

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Heptachlor)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: PC0700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.007 mg/l - 96.0 h
Toxicity to daphnia and other aquatic	LC50 - Daphnia magna (Water flea) - 0.078 mg/l - 48 h

invertebrates

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation Pimephales promelas (fathead minnow) - 276 d
- 0.00043 mg/l

Bioconcentration factor (BCF): 23,814

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solids, organic, n.o.s. (Heptachlor)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (Heptachlor)
Marine pollutant:yes

IATA
UN number: 2811 Class: 6.1 Packing group: II
Proper shipping name: Toxic solid, organic, n.o.s. (Heptachlor)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Heptachlor	76-44-8	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Heptachlor	76-44-8	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Heptachlor	76-44-8	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Heptachlor	CAS-No. 76-44-8	Revision Date 2007-09-28
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Heptachlor	CAS-No. 76-44-8	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H300	Fatal if swallowed.
H300 + H310	Fatal if swallowed or in contact with skin
H310	Fatal in contact with skin.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure.

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 04/24/2015 Print Date: 02/09/2016

SAFETY DATA SHEET

Version 3.8
Revision Date 04/24/2015
Print Date 04/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Hexachlorobenzene

Product Number : 171050
Brand : Aldrich
Index-No. : 602-065-00-6

CAS-No. : 118-74-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - repeated exposure, Oral (Category 1), H372
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H350 May cause cancer.
H372 Causes damage to organs through prolonged or repeated exposure if swallowed.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.

P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P281	Use personal protective equipment as required.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C_6Cl_6
Molecular weight	:	284.78 g/mol
CAS-No.	:	118-74-1
EC-No.	:	204-273-9
Index-No.	:	602-065-00-6

Hazardous components

Component	Classification	Concentration
Hexachlorobenzene		
	Carc. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H350, H372, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Hexachlorobenzene	118-74-1	TWA	0.002000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Porphyrin effects Skin damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 227 - 229 °C (441 - 444 °F) - lit.
f)	Initial boiling point and boiling range	323 - 326 °C (613 - 619 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available

m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 10,000 mg/kg

LD50 Oral - Mouse - 4,000 mg/kg

LD50 Oral - Cat - 1,700 mg/kg

LD50 Oral - Rabbit - 2,600 mg/kg

LD50 Oral - Guinea pig - > 3,000 mg/kg

LD50 Oral - Quail - > 6,400 mg/kg

LD50 Oral - Mammal - > 5,000 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Change in motor activity (specific assay).

LC50 Inhalation - Rat - 3,600 mg/m3

LC50 Inhalation - Mouse - 4,000 mg/m3

LC50 Inhalation - Cat - 1,600 mg/m3

LC50 Inhalation - Rabbit - 1,800 mg/m3

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Causes photosensitivity. Exposure to light can result in allergic reactions resulting in dermatologic lesions, which can vary from sunburnlike responses to edematous, vesiculated lesions, or bullae

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Hexachlorobenzene)
NTP:	Reasonably anticipated to be a human carcinogen (Hexachlorobenzene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Ingestion - Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Liver -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 7.6 mg/l - 96.0 h
	NOEC - Pimephales promelas (fathead minnow) - > 0.0048 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - > 0.005 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: Pimephales promelas (fathead minnow) - 32 d - 0.0003 mg/l

Bioconcentration factor (BCF): 22,000

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2729 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobenzene
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 2729 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: HEXACHLOROBENZENE
Marine pollutant:yes

IATA

UN number: 2729 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobenzene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Hexachlorobenzene	118-74-1	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Hexachlorobenzene	CAS-No. 118-74-1	Revision Date 2007-09-28
WARNING: This product contains a chemical known to the	CAS-No.	Revision Date

State of California to cause birth defects or other reproductive harm. Hexachlorobenzene	118-74-1	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure if swallowed.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.8 Revision Date: 04/24/2015 Print Date: 04/01/2016

SAFETY DATA SHEET

Version 4.6
Revision Date 03/03/2015
Print Date 04/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Hexachloro-1,3-butadiene

Product Number : 112194
Brand : Aldrich

CAS-No. : 87-68-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 2), H310
Skin irritation (Category 2), H315
Serious eye damage (Category 1), H318
Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 Toxic if swallowed.
H310 Fatal in contact with skin.
H315 Causes skin irritation.
H318 Causes serious eye damage.
H351 Suspected of causing cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P262 Do not get in eyes, on skin, or on clothing.

P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves/ protective clothing.
P281	Use personal protective equipment as required.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P350 + P310	IF ON SKIN: Gently wash with plenty of soap and water. Immediately call a POISON CENTER or doctor/ physician.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P361	Remove/Take off immediately all contaminated clothing.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Perchlorobutadiene
Formula	:	C_4Cl_6
Molecular weight	:	260.76 g/mol
CAS-No.	:	87-68-3
EC-No.	:	201-765-5

Hazardous components

Component	Classification	Concentration
Hexachlorobuta-1,3-diene		
	Acute Tox. 3; Acute Tox. 2; Skin Irrit. 2; Eye Dam. 1; Carc. 2; H301, H310, H315, H318, H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Hexachlorobuta-1,3-diene	87-68-3	TWA	0.020000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Kidney damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.020000 ppm 0.240000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential Occupational Carcinogen See Appendix A Potential for dermal absorption		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Tightly fitting safety goggles. Faceshield (8-inch minimum). Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -22 - -19 °C (-8 - -2 °F) - lit.
f)	Initial boiling point and boiling range	210 - 220 °C (410 - 428 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available

i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	0.3 hPa (0.2 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.665 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 82.0 mg/kg

LC50 Inhalation - Mouse - 370.0 mg/m3

LD50 Dermal - Rabbit - 100.0 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24.00 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (Hexachlorobuta-1,3-diene)

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: EJ0700000

Liver injury may occur., Kidney injury may occur., Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting

Liver -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	EC50 - Oncorhynchus mykiss (rainbow trout) - 0.14 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2279 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobutadiene
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 2279 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: HEXACHLOROBUTADIENE
Marine pollutant: yes

IATA
UN number: 2279 Class: 6.1 Packing group: III
Proper shipping name: Hexachlorobutadiene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Hexachlorobuta-1,3-diene	87-68-3	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Hexachlorobuta-1,3-diene	87-68-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Hexachlorobuta-1,3-diene	87-68-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Hexachlorobuta-1,3-diene	87-68-3	2007-07-01

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer. Hexachlorobuta-1,3-diene	87-68-3	2011-05-20

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity

Eye Dam.	Serious eye damage
H301	Toxic if swallowed.
H310	Fatal in contact with skin.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H351	Suspected of causing cancer.
Skin Irrit.	Skin irritation

HMIS Rating

Health hazard:	4
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 03/03/2015 Print Date: 04/01/2016

SAFETY DATA SHEET

Issuing Date no data available **Revision Date** 29-Oct-2015 **Revision Number** 1

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Number	**019**
Product Name	**Hexavalent Chromium - 1000 mg/L, 125 mL**
Synonyms	None

Recommended use of the chemical and restrictions on use

Recommended Use	Laboratory use only
Uses advised against	No information available

Details of the supplier of the safety data sheet

Supplier	ERA a Waters Company
Supplier Address	16341 Table Mountain Parkway, Golden, CO 80403 USA
Non-Emergency Telephone Number	+1-303-431-8454
Supplier Email	sdsinfo@waters.com

Emergency telephone number

Company Emergency Phone Number	In case of EMERGENCY call CHEMTREC Day or Night Within USA and Canada: 800-424-9300 International Call Collect: +1-703-527-3887

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200).

Respiratory sensitization	Category 1
Skin sensitization	Category 1
Germ cell mutagenicity	Category 1B
Carcinogenicity	Category 1A
Reproductive Toxicity	Category 1B

GHS Label elements, including precautionary statements

Emergency Overview

Signal word **Danger**

Hazard Statements

May cause allergy or asthma symptoms or breathing difficulties if inhaled
May cause an allergic skin reaction
May cause genetic defects
May cause cancer
May damage fertility or the unborn child



Appearance Yellow **Physical state** Liquid->Liquid **Odor** Odorless

Precautionary Statements - Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Avoid breathing dust/fume/gas/mist/vapors/spray
In case of inadequate ventilation wear respiratory protection
Contaminated work clothing should not be allowed out of the workplace
Wear protective gloves
Precautionary Statements - Response
IF exposed or concerned: Get medical advice/attention
Specific treatment (see supplemental first aid instructions on this label)
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
Inhalation
IF INHALED: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing
If experiencing respiratory symptoms: Call a POISON CENTER or doctor/physician

Precautionary Statements - Storage
Store locked up
Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

Not applicable
Unknown Toxicity
0 % of the mixture consists of ingredient(s) of unknown toxicity
Other information

Harmful to aquatic life with long lasting effects
Repeated or prolonged skin contact may cause allergic reactions with susceptible persons
Interactions with Other Chemicals
No information available.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Note: only the components contributing to the product's GHS hazard classification are listed in this section.

Synonyms None.

Chemical Name	CAS-No	Percent
Potassium Dichromate	7778-50-9	0.25

4. FIRST AID MEASURES

First aid measures

General Advice Show this safety data sheet to the doctor in attendance.
Eye contact Rinse thoroughly with plenty of water, also under the eyelids. If symptoms persist, call a physician.
Skin contact Wash with soap and water. May cause an allergic skin reaction. In the case of skin irritation or allergic reactions see a physician.
Inhalation MAY CAUSE ALLERGIC RESPIRATORY REACTION. If breathing has stopped, give artificial respiration. Get medical attention immediately. Remove to fresh air. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Seek immediate medical attention/advice.
Ingestion May produce an allergic reaction. If an allergic reaction occurs, stop use and seek medical help right away. Do NOT induce vomiting. Rinse mouth immediately and drink plenty of

water. Never give anything by mouth to an unconscious person. Call a physician or poison control center immediately.

Self-protection of the first aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Avoid contact with skin, eyes or clothing. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Use personal protective equipment as required. Wear personal protective clothing (see section 8).

Most important symptoms and effects, both acute and delayed

Most Important Symptoms and Effects Itching. Rashes. Hives. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Coughing and/ or wheezing.

Indication of any immediate medical attention and special treatment needed

Notes to Physician May cause sensitization in susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable Extinguishing Media

CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical

Product is or contains a sensitizer. May cause sensitization by skin contact. May cause sensitization by inhalation and skin contact.

Uniform Fire Code Sensitizer: Liquid

Hazardous Combustion Products

Carbon oxides.

Explosion Data

Sensitivity to Mechanical Impact No.

Sensitivity to Static Discharge No.

Protective equipment and precautions for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Personal precautions Avoid contact with skin, eyes or clothing. Use personal protective equipment as required. Ensure adequate ventilation. Evacuate personnel to safe areas. Keep people away from and upwind of spill/leak.

Other Information Refer to protective measures listed in Sections 7 and 8.

Environmental precautions

Environmental precautions Refer to protective measures listed in Sections 7 and 8. Prevent further leakage or spillage if safe to do so.

Methods and material for containment and cleaning up

Methods for containment Prevent further leakage or spillage if safe to do so.

Methods for cleaning up Pick up and transfer to properly labeled containers. Soak up with inert absorbent material.

7. HANDLING AND STORAGE

Precautions for safe handling

Handling Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Ensure adequate ventilation. In case of insufficient ventilation, wear suitable respiratory equipment.

Conditions for safe storage, including any incompatibilities

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Store locked up. Keep out of the reach of children.

Incompatible Products None known based on information supplied.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure Guidelines

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Potassium Dichromate 7778-50-9	TWA: 0.05 mg/m³ Cr	TWA: 5 µg/m³ Action Level: 2.5 µg/m³ Cr (vacated) Ceiling: 0.1 mg/m³ Ceiling: 0.1 mg/m³ CrO3 applies to any operations or sectors for which the Hexavalent Chromium standard [29 CFR 1910.1026] is stayed or is otherwise not in effect	IDLH: 15 mg/m³ Cr(VI) TWA: 0.0002 mg/m³ Cr

ACGIH TLV: American Conference of Governmental Industrial Hygienists - Threshold Limit Value OSHA PEL: Occupational Safety and Health Administration - Permissible Exposure Limits NIOSH IDLH Immediately Dangerous to Life or Health

Appropriate engineering controls

Engineering Measures Showers
Eyewash stations
Ventilation systems

Individual protection measures, such as personal protective equipment

Eye/face protection Wear safety glasses with side shields (or goggles).

Skin and body protection Wear protective gloves and protective clothing.

Respiratory protection No protective equipment is needed under normal use conditions. If exposure limits are exceeded or irritation is experienced, ventilation and evacuation may be required.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Do not eat, drink or smoke when using this product. Take off contaminated clothing and wash before reuse. Wash hands before breaks and immediately after handling the product.

9. PHYSICAL AND CHEMICAL PROPERTIES

Physical and Chemical Properties

Physical state	Liquid->Liquid		
Appearance	Yellow	**Odor**	Odorless
Color	No information available	**Odor Threshold**	No information available

Property	Values	Remarks Method
pH	5	None known
Melting / freezing point	no data available	None known
Boiling point / boiling range	no data available	None known
Flash Point	no data available	None known
Evaporation Rate	no data available	None known
Flammability (solid, gas)	no data available	None known

Flammability Limit in Air		
Upper flammability limit	no data available	
Lower flammability limit	no data available	
Vapor pressure	no data available	None known
Vapor density	no data available	None known
Specific Gravity	1	None known
Water Solubility	Soluble in water	None known
Solubility in other solvents	no data available	None known
Partition coefficient: n-octanol/water	no data available	None known
Autoignition temperature	no data available	None known
Decomposition temperature	no data available	None known
Kinematic viscosity	no data available	None known
Dynamic viscosity	no data available	None known
Explosive properties	no data available	
Oxidizing properties	no data available	

Other Information

Softening Point	no data available
Particle Size	no data available
Particle Size Distribution	

10. STABILITY AND REACTIVITY

Reactivity

no data available.

Chemical stability
Stable under recommended storage conditions.
Possibility of Hazardous Reactions
None under normal processing.
Hazardous Polymerization
Hazardous polymerization does not occur.
Conditions to avoid
None known based on information supplied.
Incompatible materials
None known based on information supplied.
Hazardous Decomposition Products
Carbon oxides.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information	.
Inhalation	May cause allergy or asthma symptoms or breathing difficulties if inhaled. Specific test data for the substance or mixture is not available. May cause sensitization in susceptible persons. (based on components).
Eye contact	Specific test data for the substance or mixture is not available.
Skin contact	Specific test data for the substance or mixture is not available. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons. (based on components).
Ingestion	Specific test data for the substance or mixture is not available. May cause additional affects as listed under "Inhalation".

Component Information

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Potassium Dichromate 7778-50-9	= 25 mg/kg (Rat) = 48 mg/kg (Rat)	= 1150 mg/kg (Rabbit) = 14 mg/kg (Rabbit)	-

Information on toxicological effects

Symptoms Itching. Rashes. Hives. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain, or flushing. Coughing and/ or wheezing.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Sensitization May cause sensitization in susceptible persons. May cause sensitization by skin contact. May cause sensitization by inhalation.

Mutagenic Effects There is no data for this product. Contains a known or suspected mutagen.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Chemical Name	ACGIH	IARC	NTP	OSHA
Potassium Dichromate 7778-50-9	A1	Group 1	Known	X

ACGIH (American Conference of Governmental Industrial Hygienists)
A1 - Known Human Carcinogen
IARC (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
NTP (National Toxicology Program)
Known - Known Carcinogen
OSHA (Occupational Safety and Health Administration of the US Department of Labor)
X - Present

Reproductive toxicity Contains a known or suspected reproductive toxin.

STOT - single exposure No information available.

STOT - repeated exposure No information available.

Chronic toxicity No known effect based on information supplied. Prolonged exposure may cause chronic effects. Repeated contact may cause allergic reactions in very susceptible persons. Contains a known or suspected mutagen. Possible risk of irreversible effects. Contains a known or suspected carcinogen. Contains a known or suspected reproductive toxin.

Target Organ Effects Skin. Respiratory system. Eyes. May affect the genetic material in germ cells (sperm and eggs). Gastrointestinal tract (GI). Reproductive system.

Aspiration Hazard No information available.

Numerical measures of toxicity Product Information

The following values are calculated based on chapter 3.1 of the GHS document

ATEmix (oral)
40,000.00 mg/kg
ATEmix (inhalation-dust/mist)
20.04 mg/L

12. ECOLOGICAL INFORMATION

Ecotoxicity

Harmful to aquatic life with long lasting effects.

Chemical Name	Toxicity to Algae	Toxicity to Fish	Toxicity to Microorganisms	Daphnia Magna (Water Flea)
Potassium Dichromate 7778-50-9		96h LC50: > 139 mg/L (Cyprinus carpio) 96h LC50: 113.6 - 155.7 mg/L (Lepomis macrochirus) 96h LC50: = 320 mg/L (Lepomis macrochirus) 96h LC50: 65.6 - 137.6 mg/L (Lepomis macrochirus) 96h LC50: = 12.3 mg/L (Oncorhynchus mykiss) 96h LC50: 21.209 - 30.046 mg/L (Oryzias latipes) 96h LC50: 15.41 - 30.36 mg/L (Pimephales promelas) 96h LC50: 14 - 20.9 mg/L (Pimephales promelas) 96h LC50: 24.81 - 34.55 mg/L (Poecilia reticulata) 96h LC50: 23 - 41.2 mg/L (Poecilia reticulata) 96h LC50: = 26 mg/L (Morone saxatilis)		

Persistence and Degradability

No information available.

Bioaccumulation

No information available

Other adverse effects

No information available.

13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Disposal methods This material, as supplied, is not a hazardous waste according to Federal regulations (40 CFR 261). This material could become a hazardous waste if it is mixed with or otherwise comes in contact with a hazardous waste, if chemical additions are made to this material, or if the material is processed or otherwise altered. Consult 40 CFR 261 to determine whether the altered material is a hazardous waste. Consult the appropriate state, regional, or local regulations for additional requirements.

Contaminated Packaging Dispose of contents/containers in accordance with local regulations.

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste
Potassium Dichromate 7778-50-9	Toxic Corrosive Ignitable

14. TRANSPORT INFORMATION

DOT Not regulated

Proper Shipping Name NON REGULATED

Hazard Class N/A

TDG Not regulated

MEX Not regulated

ICAO Not regulated

IATA Not regulated
Proper Shipping Name NON REGULATED
Special Provisions None

IMDG Not regulated
Special Provisions None
Marine Pollutant Not applicable

RID Not regulated
Special Provisions None

ADR Not regulated
Special Provisions None

ADN Not regulated

15. REGULATORY INFORMATION

International Inventories

TSCA	Complies
DSL	All components are listed either on the DSL or NDSL.
ENCS	Contact supplier for inventory compliance status
KECL	Contact supplier for inventory compliance status
PICCS	Contact supplier for inventory compliance status
AICS	Contact supplier for inventory compliance status

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances

US Federal Regulations

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

Chemical Name	CAS-No	Percent	SARA 313 - Threshold Values %
Potassium Dichromate - 7778-50-9	7778-50-9	0.25	0.1

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden release of pressure hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Potassium Dichromate 7778-50-9	10 lb	X		X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive

Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	Extremely Hazardous Substances RQs	RQ
Potassium Dichromate 7778-50-9	10 lb		RQ 10 lb final RQ RQ 4.54 kg final RQ

US State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

.

International Regulations

Component	Carcinogen Status	Exposure Limits
Potassium Dichromate 7778-50-9 (0.25)	A1	Mexico: TWA 0.05 mg/m³ Mexico: TWA 0.5 mg/m³

A1 - Confirmed Human Carcinogen

Canada
WHMIS Hazard Class
Not determined

16. OTHER INFORMATION

NFPA	**Health Hazards** 2	**Flammability** 0	**Instability** 0	**Physical and Chemical Hazards** -
HMIS	**Health Hazards** 2 *	**Flammability** 0	**Physical Hazard** 0	**Personal Protection** X

Chronic Hazard Star Legend * = Chronic Health Hazard

Prepared By
Product Stewardship
23 British American Blvd.
Latham, NY 12110
1-800-572-6501

Revision Date 29-Oct-2015
Revision Note No information available

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

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End of Safety Data Sheet

SAFETY DATA SHEET

Version 6.8
Revision Date 08/28/2024
Print Date 08/29/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Indeno[1,2,3-*cd*]pyrene

Product Number : 48499
Brand : Supelco
CAS-No. : 193-39-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Carcinogenicity (Category 2), H351

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Warning

Hazard Statements
H351 Suspected of causing cancer.

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operates as MilliporeSigma in the US and Canada

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	$C_{22}H_{12}$
Molecular weight	:	276.33 g/mol
CAS-No.	:	193-39-5
EC-No.	:	205-893-2

Component	Classification	Concentration
Indeno[1,2,3-cd]pyrene		
	Carc. 2; H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

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4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

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SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm

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Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P3
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	163.6 °C (326.5 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available

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	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

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Serious eye damage/eye irritation
Remarks: No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Indeno[1,2,3-cd]pyrene)

NTP: RAHC - Reasonably anticipated to be a human carcinogen (Indeno[1,2,3-cd]pyrene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

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12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

Not dangerous goods

IMDG

Not dangerous goods

IATA

Not dangerous goods

Further information

Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Indeno[1,2,3-cd]pyrene	193-39-5	100	100

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Chronic Health Hazard

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SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Indeno[1,2,3-cd]pyrene	193-39-5	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

Indeno[1,2,3-cd]pyrene	193-39-5

Pennsylvania Right To Know

Indeno[1,2,3-cd]pyrene	193-39-5

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including Indeno[1,2,3-cd]pyrene, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

Version 6.8
Revision Date 30.05.2024
Print Date 16.09.2024
GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name	:	Iron
Product Number	:	12310
Brand	:	Aldrich
REACH No.	:	01-2119462838-24-XXXX
CAS-No.	:	7439-89-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses	:	Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company	:	Sigma-Aldrich Inc. 3050 SPRUCE ST ST. LOUIS MO 63103 UNITED STATES
Telephone	:	+1 314 771-5765
Fax	:	+1 800 325-5052

1.4 Emergency telephone

Emergency Phone #	:	800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Flammable solids, (Category 1)	H228: Flammable solid.
Self-heating substances and mixtures, (Category 1)	H251: Self-heating; may catch fire.

2.2 Label elements

Labelling according Regulation (EC) No 1272/2008

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Pictogram	
Signal Word	Danger
Hazard Statements	
H228	Flammable solid.
H251	Self-heating; may catch fire.
Precautionary Statements	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P235	Keep cool.
P240	Ground and bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
Supplemental Hazard Statements	none

Reduced Labeling (<= 125 ml)

Pictogram	
Signal Word	Danger
Hazard Statements	
H251	Self-heating; may catch fire.
Precautionary Statements	
P235	Keep cool.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.
Toxicological information:
The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

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SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Fe
Molecular weight	:	55,85 g/mol
CAS-No.	:	7439-89-6
EC-No.	:	231-096-4

No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Iron oxides
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

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5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up
Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 4.2: Pyrophoric and self-heating hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

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SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.
Recommended Filter type: Filter type P1

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Physical state	powder
b)	Color	light gray
c)	Odor	odorless
d)	Melting point/freezing point	Melting point/range: 1.538 °C at 1.023 hPa
e)	Initial boiling point and boiling range	2.861 °C at 1.013 hPa
f)	Flammability (solid, gas)	The substance or mixture is a flammable solid with the category 1.
g)	Upper/lower flammability or explosive limits	No data available
h)	Flash point	Not applicable
i)	Autoignition temperature	The substance or mixture is classified as self heating with the category 1.

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j)	Decomposition temperature	No data available
k)	pH	Not applicable
l)	Viscosity	Viscosity, kinematic: No data available Viscosity, dynamic: No data available
m)	Water solubility	insoluble
n)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
o)	Vapor pressure	Not applicable
p)	Density	7,87 g/cm3 at 20 °C
	Relative density	7,87 at 20 °C
q)	Relative vapor density	
r)	Particle characteristics	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	The substance or mixture is not classified as oxidizing.

9.2 Other safety information

Dust explosion class St1

SECTION 10: Stability and reactivity

10.1 Reactivity

Self-heating; may catch fire.
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

no information available

10.5 Incompatible materials

Strong acids

10.6 Hazardous decomposition products

In the event of fire: see section 5

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 7.500 mg/kg
Remarks: (Lit.)
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)
Remarks: (Lit.)

Respiratory or skin sensitization
Did not cause sensitization on laboratory animals.

Germ cell mutagenicity
Test system: S. typhimurium
Method: OECD Test Guideline 471
Result: Not mutagenic in Ames Test.
Remarks: (Lit.)

Carcinogenicity
No data available

Reproductive toxicity
Did not show teratogenic effects in animal experiments.
Animal testing did not show any effects on fertility.

Specific target organ toxicity - single exposure
The substance or mixture is not classified as specific target organ toxicant, single exposure.

Specific target organ toxicity - repeated exposure
The substance or mixture is not classified as specific target organ toxicant, repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

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SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test	- Morone saxatilis - 13,6 mg/l - 96 h

12.2 Persistence and degradability
Not applicable

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties
Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods
No data available

SECTION 14: Transport information

14.1 UN number
ADR/RID: 3178 IMDG: 3178 IATA: 3178

14.2 UN proper shipping name
ADR/RID: FLAMMABLE SOLID, INORGANIC, N.O.S. (Iron Powder,)
IMDG: FLAMMABLE SOLID, INORGANIC, N.O.S. (Iron Powder,)
IATA: Flammable solid, inorganic, n.o.s. (Iron Powder,)

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14.3 Transport hazard class(es)

ADR/RID: 4.1	IMDG: 4.1	IATA: 4.1

14.4 Packaging group

ADR/RID: III	IMDG: III	IATA: III

14.5 Environmental hazards

ADR/RID: no	IMDG Marine pollutant: no	IATA: no

14.6 Special precautions for user

Tunnel restriction code : (E)

Further information : No data available

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture

This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.

Other regulations

Take note of Dir 94/33/EC on the protection of young people at work.

15.2 Chemical Safety Assessment

For this product a chemical safety assessment was not carried out

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SECTION 16: Other information

Full text of other abbreviations

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

Version 5.5
Revision Date 06/02/2016
Print Date 11/14/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Isophorone

Product Number : I18709
Brand : Aldrich
Index-No. : 606-012-00-8

CAS-No. : 78-59-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute toxicity, Dermal (Category 4), H312
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H302 + H312 Harmful if swallowed or in contact with skin
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H351 Suspected of causing cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	3,5,5-Trimethyl-2-cyclohexen-1-one
Formula	:	$C_9H_{14}O$
Molecular weight	:	138.21 g/mol
CAS-No.	:	78-59-1
EC-No.	:	201-126-0
Index-No.	:	606-012-00-8

Hazardous components

Component	Classification	Concentration
Isophorone		
	Acute Tox. 4; Eye Irrit. 2A; Carc. 2; STOT SE 3; H302 + H312, H319, H335, H351	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Combustible liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Isophorone	78-59-1	C	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Malaise Fatigue Confirmed animal carcinogen with unknown relevance to humans		

		TWA	4.000000 ppm 23.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	25.000000 ppm 140.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		PEL	4 ppm 23 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 50 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a) Appearance — Form: liquid, clear
Colour: light yellow

b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -8 °C (18 °F) - lit.
f)	Initial boiling point and boiling range	213 - 214 °C (415 - 417 °F) - lit.
g)	Flash point	96.0 °C (204.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 3.8 %(V) Lower explosion limit: 0.8 %(V)
k)	Vapour pressure	1.3 hPa (1.0 mmHg) at 38.0 °C (100.4 °F) 0.3 hPa (0.2 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.923 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	462.0 °C (863.6 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong acids, Strong bases

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,870 mg/kg

LC50 Inhalation - Guinea pig - 8 h - 4600 ppm

LD50 Dermal - Rabbit - 1,382 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GW7700000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Central nervous system depression, narcosis

Central nervous system -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	NOEC - Cyprinodon variegatus (sheepshead minnow) - 170 mg/l - 96 h
	LC50 - Pimephales promelas (fathead minnow) - 145 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 120 mg/l - 48 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 14 d - 0.0924 mg/l
	Bioconcentration factor (BCF): 7

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3082 Class: 9 Packing group: III

Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Isophorone)

Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG

Not dangerous goods

IATA

Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Isophorone	78-59-1	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Isophorone	78-59-1	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Isophorone	78-59-1	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H302	Harmful if swallowed.
H302 + H312	Harmful if swallowed or in contact with skin
H312	Harmful in contact with skin.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	1
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	1
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 06/02/2016 Print Date: 11/14/2016

SAFETY DATA SHEET

Version 4.7
Revision Date 12/29/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Lead

Product Number : 391352
Brand : Aldrich

CAS-No. : 7439-92-1

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H351 Suspected of causing cancer.
H361 Suspected of damaging fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and

	understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Pb
Molecular weight	:	207.20 g/mol
CAS-No.	:	7439-92-1
EC-No.	:	231-100-4

Hazardous components

Component	Classification	Concentration
Lead		
	Acute Tox. 4; Carc. 2; Repr. 2; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H302, H351, H361, H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Lead oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Keep in a dry place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
	Remarks	See 1910.1025		
Lead	7439-92-1	TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans		
		TWA	0.05 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Hematologic effects Peripheral Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans		

		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
		See Appendix C		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Lead	7439-92-1	Lead	30µg/ 100 ml	In blood	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Not critical			
		Lead	30µg/ 100 ml	In blood	ACGIH - Biological Exposure Indices (BEI)
		Not critical			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 327.4 °C (621.3 °F) - lit.
f)	Initial boiling point and boiling range	1,740 °C (3,164 °F) - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong acids

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity

Rat
Cytogenetic analysis

Carcinogenicity

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Lead)
NTP:	Reasonably anticipated to be a human carcinogen (Lead)
	Reasonably anticipated to be a human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Lead)
OSHA:	1910.1025 (Lead)
	OSHA specifically regulated carcinogen (Lead)

Reproductive toxicity
Suspected human reproductive toxicant

Reproductive toxicity - Rat - Inhalation
Effects on Newborn: Biochemical and metabolic.

Reproductive toxicity - Rat - Oral
Effects on Newborn: Behavioral.

Reproductive toxicity - Mouse - Oral
Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Developmental Toxicity - Rat - Inhalation
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow).

Developmental Toxicity - Rat - Oral
Specific Developmental Abnormalities: Blood and lymphatic system (including spleen and marrow). Effects on Newborn: Growth statistics (e.g., reduced weight gain).

Developmental Toxicity - Rat - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Developmental Toxicity - Mouse - Oral
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: OF7525000

anemia

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LOEC - Oncorhynchus mykiss (rainbow trout) - 1.19 mg/l - 96.0 h
	LC50 - Micropterus dolomieui - 2.2 mg/l - 96.0 h
	mortality NOEC - Salvelinus fontinalis - 1.7 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates	mortality LOEC - Daphnia (water flea) - 0.17 mg/l - 24 h
	mortality NOEC - Daphnia (water flea) - 0.099 mg/l - 24 h
Toxicity to algae	mortality EC50 - Skeletonema costatum - 7.94 mg/l - 10 d

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Bioaccumulation: Oncorhynchus kisutch - 2 Weeks - 150 µg/l

Bioconcentration factor (BCF): 12

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Lead)
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3077 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Lead)
Marine pollutant:yes
IATA
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, solid, n.o.s. (Lead)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Lead	7439-92-1	1994-04-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Lead	CAS-No. 7439-92-1	Revision Date 1989-07-10
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Lead	CAS-No. 7439-92-1	Revision Date 1989-07-10

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7 Revision Date: 12/29/2015 Print Date: 02/07/2016

SAFETY DATA SHEET

Version 5.7
Revision Date 05/27/2015
Print Date 02/23/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Lindane

Product Number : 233390
Brand : Aldrich
Index-No. : 602-043-00-6

CAS-No. : 58-89-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Carcinogenicity (Category 2), H351
Effects on or via lactation, H362
Specific target organ toxicity - repeated exposure (Category 2), H373
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H301	Toxic if swallowed.
H312 + H332	Harmful in contact with skin or if inhaled
H351	Suspected of causing cancer.
H362	May cause harm to breast-fed children.
H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P263	Avoid contact during pregnancy/ while nursing.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1α,2α,3β,4α,5α,6β-Hexachlorocyclohexane γ-BHC
Formula	:	$C_6H_6Cl_6$
Molecular weight	:	290.83 g/mol
CAS-No.	:	58-89-9
EC-No.	:	200-401-2
Index-No.	:	602-043-00-6

Hazardous components

Component	Classification	Concentration
γ-1,2,3,4,5,6-Hexachlorocyclohexane		
	Acute Tox. 3; Acute Tox. 4; Carc. 2; Lact. ; STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H301, H312 + H332, H351, H362, H373, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
γ-1,2,3,4,5,6-Hexachlorocyclohexane	58-89-9	TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Liver damage Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.500000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 113 - 115 °C (235 - 239 °F) - lit.
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.85 g/cm3
n)	Water solubility	8.35 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	Pow: 3.5 at 22 °C (72 °F)
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Strong oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 88.0 mg/kg

LC50 Inhalation - Rat - 4 h - 1,560 mg/m3

Dermal: No data available

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

Respiratory or skin sensitisation
Will not occur

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	2B - Group 2B: Possibly carcinogenic to humans (γ-1,2,3,4,5,6-Hexachlorocyclohexane)
NTP:	Reasonably anticipated to be a human carcinogenThe reference note has been added by TD based on the background information of the NTP. (γ-1,2,3,4,5,6-Hexachlorocyclohexane)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Effects on or via lactation

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GV4900000

Neurotoxic effects., Cyanosis, Headache, Nausea, Incoordination., Tremors, Vomiting, Dizziness, Seizures., Unconsciousness

Reproductive system. - Irregularities - Based on Human Evidence
Reproductive system. - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 0.2 mg/l - 96.0 h
	LC50 - Cyprinodon variegatus (sheepshead minnow) - 0.9 - 1.3 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.03 - 0.28 mg/l - 48.0 h
	NOEC - Oncorhynchus mykiss (rainbow trout) - 0.056 mg/l - 3.0 d
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.038 mg/l - 96.0 h

	LOEC - Oncorhynchus mykiss (rainbow trout) - 0.1 mg/l - 3.0 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.80 - 6.50 mg/l - 48 h
	LOEC - Daphnia (water flea) - 0.021 mg/l - 7 d
Toxicity to algae	EC50 - Algae - 4.00 mg/l - 72 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential

Bioaccumulation	Pimephales promelas (fathead minnow) - 304 d - 0.0091 mg/l
	Bioconcentration factor (BCF): 674

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
Very toxic to aquatic life with long lasting effects.
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solids, organic, n.o.s. (γ-1,2,3,4,5,6-Hexachlorocyclohexane)
Reportable Quantity (RQ): 1 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2811 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TOXIC SOLID, ORGANIC, N.O.S. (γ-1,2,3,4,5,6-Hexachlorocyclohexane)
Marine pollutant:yes

IATA
UN number: 2811 Class: 6.1 Packing group: III
Proper shipping name: Toxic solid, organic, n.o.s. (γ-1,2,3,4,5,6-Hexachlorocyclohexane)

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
γ-1,2,3,4,5,6-Hexachlorocyclohexane	58-89-9	2007-07-01

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
γ-1,2,3,4,5,6-Hexachlorocyclohexane	58-89-9	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
γ-1,2,3,4,5,6-Hexachlorocyclohexane	58-89-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
γ-1,2,3,4,5,6-Hexachlorocyclohexane	58-89-9	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
γ-1,2,3,4,5,6-Hexachlorocyclohexane	58-89-9	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
γ-1,2,3,4,5,6-Hexachlorocyclohexane	58-89-9	2009-02-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H301	Toxic if swallowed.
H312	Harmful in contact with skin.
H312 + H332	Harmful in contact with skin or if inhaled
H332	Harmful if inhaled.
H351	Suspected of causing cancer.
H362	May cause harm to breast-fed children.
H373	May cause damage to organs through prolonged or repeated exposure.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.7 Revision Date: 05/27/2015 Print Date: 02/23/2016

SAFETY DATA SHEET

Version 6.6
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Magnesium

Product Number : 266302
Brand : Sigma-Aldrich
Index-No. : 012-002-00-9
CAS-No. : 7439-95-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable solids (Category 1), H228
Self-heating chemicals (Category 1), H251
Chemicals which, in contact with water, emit flammable gases (Category 2), H261

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operates as MilliporeSigma in the US and Canada

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Danger

Hazard Statements

H228	Flammable solid.
H251	Self-heating; may catch fire.
H261	In contact with water releases flammable gas.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P223	Do not allow contact with water.
P231 + P232	Handle under inert gas. Protect from moisture.
P235 + P410	Keep cool. Protect from sunlight.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P280	Wear protective gloves/ eye protection/ face protection.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P402 + P404	Store in a dry place. Store in a closed container.
P403 + P235	Store in a well-ventilated place. Keep cool.
P407	Maintain air gap between stacks/ pallets.
P420	Store away from other materials.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Mg
Molecular weight	:	24.31 g/mol
CAS-No.	:	7439-95-4
EC-No.	:	231-104-6
Index-No.	:	012-002-00-9

No components need to be disclosed according to the applicable regulations.

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: make victim drink water (two glasses at most). Consult doctor if feeling unwell.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Special powder against metal fire Cover with dry sand or cement.

Unsuitable extinguishing media
Foam Water

5.2 Special hazards arising from the substance or mixture

Magnesium oxide
Not combustible.
May not get in touch with: Water
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

none

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Keep workplace dry. Do not allow product to come into contact with water.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep away from heat and sources of ignition.
Never allow product to get in contact with water during storage.

Storage class
Storage class (TRGS 510): 4.2: Pyrophoric and self-heating hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

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8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type P1
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: chips
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 648 °C (1198 °F) - lit.
f)	Initial boiling point and boiling range	1,090 °C 1,994 °F - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form combustible dust concentrations in air.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	1 hPa at 621 °C (1150 °F)
l)	Vapor density	No data available
m)	Density	1.74 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	The substance or mixture is classified as self heating with the category 1.
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

No data available

SECTION 10: Stability and reactivity

10.1 Reactivity

Self-heating; may catch fire.

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10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of ignition or formation of inflammable gases or vapours with:
Oxidizing agents
alkalines
Halogenated hydrocarbon
halogens
Alcohols
nitrates
acids
Water

10.4 Conditions to avoid
Exposure to moisture. Exposure to air.
Moisture.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
Remarks: No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

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Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, chills, Fever, fatigue, muscle pain, joint pain, rash, Anorexia.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Liver - Irregularities - Based on Human Evidence

Liver - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1869 Class: 4.1 Packing group: III
Proper shipping name: Magnesium
Reportable Quantity (RQ):
Poison Inhalation Hazard: No

IMDG
UN number: 1869 Class: 4.1 Packing group: III EMS-No: F-G, S-G
Proper shipping name: MAGNESIUM

IATA
UN number: 1869 Class: 4.1 Packing group: III
Proper shipping name: Magnesium

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Reactivity Hazard
Chronic Health Hazard

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know
No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.6 Revision Date: 09/06/2024 Print Date: 09/07/2024

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Manganese

Product Number : 463728
Brand : Aldrich

CAS-No. : 7439-96-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H260 In contact with water releases flammable gases which may ignite spontaneously.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P223 Keep away from any possible contact with water, because of violent reaction and possible flash fire.
P231 + P232 Handle under inert gas. Protect from moisture.
P273 Avoid release to the environment.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P335 + P334 Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.

P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Mn
Molecular weight	:	54.94 g/mol
CAS-No.	:	7439-96-5
EC-No.	:	231-105-1

Hazardous components

Component	Classification	Concentration
Manganese		
	Water-react. 1; Aquatic Acute 3; Aquatic Chronic 3; H260, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder Carbon dioxide (CO2)

Unsuitable extinguishing media
Water

5.2 Special hazards arising from the substance or mixture
Manganese/manganese oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Moisture sensitive. Keep in a dry place.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Manganese	7439-96-5	TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC)		
		C	5 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		

		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		C	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Ceiling limit is to be determined from breathing-zone air samples.		
		TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.200000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) varies		
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.020000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment 2014 Adoption varies		
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		
		TWA	0.02 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment varies		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
impervious clothing, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 1,244 °C (2,271 °F) - lit.
f)	Initial boiling point and boiling range	1,962 °C (3,564 °F) - lit.
g)	Flash point	Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	7.3 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
acids, Halogens, Bases, Phosphorus, Sulphur oxides, Peroxides

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 9,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Rat - Intramuscular
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: OO9275000

Men exposed to manganese dusts showed a decrease in fertility. Chronic manganese poisoning primarily involves the central nervous system. Early symptoms include languor, sleepiness and weakness in the legs. A stolid mask-like appearance of the face, emotional disturbances such as uncontrollable laughter and a spastic gait with tendency to fall in walking are findings in more advanced cases. High incidence of pneumonia has been found in workers exposed to the dust or fume of some manganese compounds.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 40 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)

Poison Inhalation Hazard: No

IMDG
UN number: 3208 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: METALLIC SUBSTANCE, WATER-REACTIVE, N.O.S. (Manganese)

IATA
UN number: 3208 Class: 4.3 Packing group: I
Proper shipping name: Metallic substance, water-reactive, n.o.s. (Manganese)
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

SARA 311/312 Hazards
Reactivity Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Manganese	7439-96-5	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H260	In contact with water releases flammable gases which may ignite spontaneously.
H402	Harmful to aquatic life.
H412	Harmful to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	2

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	2
Special hazard.I:	W

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 03/02/2015 Print Date: 02/07/2016

SAFETY DATA SHEET

Version 6.12
Revision Date 07/27/2024
Print Date 07/28/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : *m*-Cresol

Product Number : W353000
Brand : Aldrich
Index-No. : 604-004-00-9
CAS-No. : 108-39-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 3), H311

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Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word	Danger
Hazard Statements	
H227	Combustible liquid.
H301 + H311	Toxic if swallowed or in contact with skin.
H314	Causes severe skin burns and eye damage.
H401	Toxic to aquatic life.
H412	Harmful to aquatic life with long lasting effects.
Precautionary Statements	
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 3-Methylphenol

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Formula	:	C_7H_8O
Molecular weight	:	108.14 g/mol
CAS-No.	:	108-39-4
EC-No.	:	203-577-9
Index-No.	:	604-004-00-9

Component	Classification	Concentration
meta-Cresol		
	Flam. Liq. 4; Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 2; Aquatic Chronic 3; H227, H301, H311, H314, H318, H401, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Call a physician immediately.

In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

The life science business of Merck KGaA, Darmstadt, Germany
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SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures

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Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Moisture sensitive.

Storage class
Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
meta-Cresol	108-39-4	TWA	2.3 ppm 10 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5 ppm 22 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation		
		TWA	20 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Not classifiable as a human carcinogen Danger of cutaneous absorption		
		PEL	5 ppm 22 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

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operates as MilliporeSigma in the US and Canada

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Chloroprene
Minimum layer thickness: 0.65 mm
Break through time: 480 min
Material tested:KCL 720 Camapren®

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Latex gloves
Minimum layer thickness: 0.6 mm
Break through time: 60 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter A-(P3)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless, light yellow
b)	Odor	phenol-like

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c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 8 - 10 °C (46 - 50 °F) - lit.
f)	Initial boiling point and boiling range	203 °C 397 °F - lit.
g)	Flash point	86 °C (187 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 1.35 %(V) Lower explosion limit: 1.06 %(V)
k)	Vapor pressure	< 1 hPa at 20 °C (68 °F)
l)	Vapor density	3.73 - (Air = 1.0)
m)	Density	1.034 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	1.0320 °C
n)	Water solubility	22.7 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 1.96 - Bioaccumulation is not expected.
p)	Autoignition temperature	559 °C (1038 °F) at 1,013 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	Not classified as explosive.
t)	Oxidizing properties	none

9.2 Other safety information

Dissociation constant	10.09 at 25 °C (77 °F)
Relative vapor density	3.73 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

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10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents
Nitric acid
fuming sulfuric acid
chlorosulfonic acid
alkalines
Iron
Lead

10.4 Conditions to avoid
Strong heating.

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 242 mg/kg
(OECD Test Guideline 401)
Symptoms: If ingested, severe burns of the mouth and throat, as well as a danger of perforation of the esophagus and the stomach.
Symptoms: mucosal irritations, Cough, Shortness of breath, Possible damages:, damage of respiratory tract
Inhalation: Corrosive to respiratory system.
LD50 Dermal - Rabbit - 620 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity).
Behavioral:Tetany.
(RTECS)

Skin corrosion/irritation
Skin - Rabbit
Result: Causes burns. - 24 h
Remarks: (ECHA)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Serious eye damage/eye irritation
Remarks: Causes serious eye damage.

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
Test Type: Ames test
Test system: Escherichia coli/Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471

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Result: negative
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473
Result: positive
Test Type: In vitro mammalian cell gene mutation test
Test system: mouse lymphoma cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative

Test Type: Chromosome aberration test
Species: Mouse
Cell type: Bone marrow
Application Route: Oral
Method: OECD Test Guideline 475
Result: negative

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male - Oral - 13 Weeks - NOAEL (No observed adverse effect level) - 50 mg/kg

RTECS: GO6125000
Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Cough, Shortness of breath, Headache, Nausea
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

Systemic effects:

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Headache
Nausea
Vomiting
Dizziness
agitation, spasms
respiratory arrest
Unconsciousness

Damage to:

Central nervous system
Liver
Kidney

This substance should be handled with particular care.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	static test LC50 - Salvelinus fontinalis - 7.6 mg/l - 96 h Remarks: (ECHA)
	static test LC50 - Oncorhynchus mykiss (rainbow trout) - 8.6 mg/l - 96 h Remarks: (ECHA)
	static test LC50 - Salmo trutta (brown trout) - 8.4 mg/l - 96 h Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	flow-through test EC50 - Daphnia pulicaria - > 99.5 mg/l - 48 h (US-EPA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Pimephales promelas (fathead minnow) - 1.35 mg/l - 32 d (OECD Test Guideline 210) Remarks: The value is given in analogy to the following substances: p-cresol
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 1 mg/l - 21 d Remarks: (ECHA) The value is given in analogy to the following substances: p-cresol

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12.2 Persistence and degradability

Biodegradability aerobic - Exposure time 10 d
Result: 96 % - Inherently biodegradable.
(OECD Test Guideline 302B)

12.3 Bioaccumulative potential

Bioaccumulation Leuciscus idus (Golden orfe) - 3 d
- 0.05 mg/l(meta-Cresol)

Bioconcentration factor (BCF): 17 - 20

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

Biological effects:
Hazard for drinking water supplies.
Change in the flavour characteristics of fish protein.
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)

UN number: 2076 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, liquid
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 100 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 2076 Class: 6.1 (8) Packing group: II EMS-No: F-A, S-B
Proper shipping name: CRESOLS, LIQUID

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IATA
UN number: 2076 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, liquid

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
meta-Cresol	108-39-4	100	100
meta-Cresol	108-39-4	100	100 (D024)

SARA 304 Extremely Hazardous Substances Reportable Quantity

This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

meta-Cresol 108-39-4 >= 90 - <= 100 %

Clean Air Act

This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).
The following chemical(s) are listed as HAP under the U.S. Clean Air Act, Section 112 (40 CFR 61):

meta-Cresol 108-39-4 >= 90 - <= 100 %

This product does not contain any chemicals listed under the U.S. Clean Air Act Section 112(r) for Accidental Release Prevention (40 CFR 68.130, Subpart F).
The following chemical(s) are listed under the U.S. Clean Air Act Section 111 SOCMI Intermediate or Final VOC's (40 CFR 60.489):

meta-Cresol 108-39-4 >= 90 - <= 100 %

Clean Water Act

The following Hazardous Substances are listed under the U.S. CleanWater Act, Section 311, Table 116.4A:

meta-Cresol 108-39-4 >= 90 - <= 100 %

This product does not contain any Hazardous Chemicals listed under the U.S. CleanWater Act, Section 311, Table 117.3.
This product does not contain any toxic pollutants listed under the U.S. Clean Water Act Section 307
This product does not contain any priority pollutants related to the U.S. Clean Water Act

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US State Regulations

Massachusetts Right To Know

meta-Cresol	108-39-4

Pennsylvania Right To Know

meta-Cresol	108-39-4

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.12 Revision Date: 07/27/2024 Print Date: 07/28/2024

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SAFETY DATA SHEET

Version 6.5
Revision Date 02/07/2023
Print Date 02/07/2023

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Mercury

Product Number : 215457
Brand : SIGALD
Index-No. : 080-001-00-0
CAS-No. : 7439-97-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Scientific research and development, Reagent for analysis

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Inhalation (Category 2), H330
Reproductive toxicity (Category 1B), H360
Specific target organ toxicity - repeated exposure (Category 1), H372
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Danger

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Hazard statement(s)

H330	Fatal if inhaled.
H360	May damage fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Formula	:	Hg
Molecular weight	:	200.59 g/mol
CAS-No.	:	7439-97-6
EC-No.	:	231-106-7
Index-No.	:	080-001-00-0

Component	Classification	Concentration
mercury		
	Acute Tox. 2; Repr. 1B; STOT RE 1; Aquatic Acute 1; Aquatic Chronic 1; H330, H360, H372, H400, H410 M-Factor - Aquatic Acute: 1 - Aquatic Chronic: 100	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Mercury/mercury oxides.
Not combustible.
Ambient fire may liberate hazardous vapours.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal. In some instances, a mercury spill kit may be used. Please consult with your site EHS representative to determine the most appropriate clean up method.Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Store under inert gas.

Storage class
Storage class (TRGS 510): 6.1B: Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
mercury	7439-97-6	C	0.1 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	Potential for dermal absorption		
		CEIL	1.0mg/10m3	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		TWA	0.05 mg/m3	USA. Table Z-1-A Limits for Air Contaminants (1989 vacated values)
		Skin notation		
		TWA	0.025 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Kidney damage Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen Danger of cutaneous absorption		
		TWA	0.05 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN374 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

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Body Protection
protective clothing

Respiratory protection
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: silver, white
b)	Odor	odorless
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -38.87 °C (-37.97 °F) - lit.
f)	Initial boiling point and boiling range	356.6 °C 673.9 °F - lit.
g)	Flash point	()Not applicable
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	The product is not flammable.
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	< 0.01 hPa at 20 °C (68 °F) 1 hPa at 126 °C(259 °F)
l)	Vapor density	6.93 - (Air = 1.0)
m)	Density	13.55 g/cm3 at 25 °C (77 °F)
	Relative density	No data available
n)	Water solubility	0.00006 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	Not applicable for inorganic substances
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

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s) Explosive properties No data available

t) Oxidizing properties none

9.2 Other safety information

Relative vapor density	6.93 - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of explosion with:
Acetylene
Alkali metals
Aluminum
Amines
Ammonia
chlorine dioxide
Potassium
sodium
oxalic acid
perchlorates
Risk of ignition or formation of inflammable gases or vapours with:
Chlorine
silanes
Oxygen
Generates dangerous gases or fumes in contact with:
Nitric acid
Exothermic reaction with:
Bromine
Metals
acetylidene
Oxygen

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
Aluminum, Lead, Copper, silver, Zinc, zinc alloys, Tin

10.6 Hazardous decomposition products
In the event of fire: see section 5

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SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
LC50 Inhalation - Rat - male - 2 h - < 27 mg/m3 - vapor

Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
Presumed human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

RTECS: OV4550000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

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SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	mortality LC50 - Cyprinus carpio (Carp) - 0.160 mg/l - 96 h
Toxicity to fish(Chronic toxicity)	Remarks: No data available (mercury)

12.2 Persistence and degradability

The methods for determining biodegradability are not applicable to inorganic substances.

12.3 Bioaccumulative potential

Bioaccumulation	Carassius auratus (goldfish) - 1,789 d - 0.25 µg/l(mercury)
	Bioconcentration factor (BCF): 155,986

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself. See www.retrologistik.com for processes regarding the return of chemicals and containers, or contact us there if you have further questions.

SECTION 14: Transport information

DOT (US)

UN number: 2809 Class: 8 (6.1) Packing group: III
Proper shipping name: Mercury
Reportable Quantity (RQ): 1 lbs
Reportable Quantity (RQ): 1 lbs
Poison Inhalation Hazard: No

IMDG

UN number: 2809 Class: 8 (6.1) Packing group: III EMS-No: F-A, S-B
Proper shipping name: MERCURY
Marine pollutant : yes

IATA

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UN number: 2809 Class: 8 (6.1) Packing group: III
Proper shipping name: Mercury

SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
mercury	7439-97-6	2015-11-23

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Reportable Quantity : D009 lbs

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
mercury	7439-97-6	2015-11-23

California Prop. 65 Components

	CAS-No.	Revision Date
, which is/are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.mercury	7439-97-6	2013-12-20

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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SAFETY DATA SHEET

Methyl Bromide (MUP)

Version: 1.0 | Revision Date: 05/14/2015 | Print Date: 08/13/2015

SECTION 1. PRODUCT AND COMPANY IDENTIFICATION

Product name: Methyl Bromide (MUP)

Product Use Description: EPA Registered Pesticide

Synonyms: Methyl Bromide

Company: Chemtura Corporation
199 Benson Road
Middlebury, CT
06749
United States of America

Telephone: (US) +1 866-430-2775

Emergency telephone number: CHEMTREC: (24 hours) 800-424-9300
:
Chemtura Corporation Emergency Response: CHEMTURA : 800-292-5898

For additional emergency telephone numbers see section 16 of the Safety Data Sheet.

Prepared by Product Safety Department
(US) +1 866-430-2775

MSDSRequest@chemtura.com

Recommended use of the chemical and restrictions on use

Recommended use : EPA Registered Pesticide

SECTION 2. HAZARDS IDENTIFICATION

Form	gas
Colour	colourless
Odour	odourless

GHS Classification

Flammable gases	:	Category 1
Acute toxicity (Oral)	:	Category 3
Acute toxicity (Inhalation)	:	Category 3
Skin irritation	:	Category 2
Eye irritation	:	Category 2A
Germ cell mutagenicity	:	Category 2
Specific target organ toxicity - single exposure	:	Category 3 (Respiratory system)
Specific target organ toxicity - repeated exposure	:	Category 2

Acute aquatic toxicity : Category 1

GHS Label element

Signal word : **Danger**

Hazard pictograms :



Hazard statements : H220 Extremely flammable gas.
H301 + H331 Toxic if swallowed or if inhaled
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H341 Suspected of causing genetic defects.
H373 May cause damage to organs through prolonged or repeated exposure.
H400 Very toxic to aquatic life.

Other hazards : None

Precautionary statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P273 Avoid release to the environment.
P280 Wear eye protection/ face protection.
P281 Use personal protective equipment as required.
Response:
P301 + P310 + P330 IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P311 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: Get medical advice/

attention.
P362 Take off contaminated clothing and wash before reuse.
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 Eliminate all ignition sources if safe to do so.
P391 Collect spillage.
Storage:
P403 Store in a well-ventilated place.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Carcinogenicity:

IARC Group 3: Not classifiable as to its carcinogenicity to humans

bromomethane	74-83-9
chloromethane	74-87-3

OSHA No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

NTP No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Environmental Effects

Environmental Effects : Dangerous for the environment

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components

Chemical Name	CAS-No.	Concentration (%)
bromomethane	74-83-9	>= 90 - <= 100 %
chloromethane	74-87-3	>= 0.1 - < 1 %

SECTION 4. FIRST AID MEASURES

If inhaled : Get medical attention immediately.
If breathed in, move person into fresh air.
Give oxygen or artificial respiration if needed.

In case of skin contact : Get medical attention immediately.
Take off contaminated clothing and shoes immediately.
Wash off immediately with plenty of water for at least 15 minutes.
Wash contaminated clothing before re-use.
Destroy contaminated shoes.

In case of eye contact	:	Get medical attention immediately. Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Get medical attention.
If swallowed	:	Call a physician or poison control centre immediately. If swallowed, DO NOT induce vomiting unless directed to do so by medical personnel. Rinse mouth with water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	:	irritant effects mutagenic effects Gastrointestinal disturbance Nausea Vomiting Respiratory disorder Unconsciousness Inhalation may provoke the following symptoms: Fatality
Notes to physician	:	For specialist advice physicians should contact the Poisons Information Service.

SECTION 5. FIREFIGHTING MEASURES

Suitable extinguishing media	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Keep containers and surroundings cool with water spray.
Specific hazards during firefighting	:	Burning produces noxious and toxic fumes. Thermal decomposition can lead to release of irritating gases and vapours. Container may explode if heated.
Specific extinguishing methods	:	In the event of fire, wear self-contained breathing apparatus. Wear personal protective equipment.
Special protective equipment for firefighters	:	Wear full protective clothing and self-contained breathing apparatus.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	For personal protection see section 8.

Environmental precautions	:	Toxic to aquatic life. Do not contaminate ponds, waterways or ditches with chemical or used container. If the product contaminates rivers and lakes or drains inform respective authorities.
Methods and materials for containment and cleaning up	:	Inform the responsible authorities in case of gas leakage, or of entry into waterways, soil or drains.

SECTION 7. HANDLING AND STORAGE

Advice on safe handling	:	Methyl bromide has no odor at dangerous levels and is extremely hazardous. Use personal protective equipment as required. Do not contaminate water, food or feed by storage or disposal. Avoid contact with skin, eyes and clothing. Do not breathe vapours or spray mist. Persons moving or handling containers should wear protective clothing. Open container only in a well-ventilated area wearing protective clothing and respiratory protection if necessary. Cylinders should not be subjected to rough handling or mechanical shock such as dropping, bumping, dragging, or sliding. Do not use rope slings, hooks, tongs, or similar devices to unload cylinders. Transport cylinders using hand truck, fork truck or other device to which the cylinder can be firmly secured. Do not remove valve protection bonnet and safety cap until immediately before use. Replace safety cap and valve protection bonnet when cylinder is not in use. When cylinder is empty close, valve, screw safety cap onto valve outlet, and replace protection bonnet before returning to shipper. Only a registrant is authorized to refill cylinders. Do not use cylinders for any other purpose.
Conditions for safe storage	:	Store in upright position only. Keep in a dry, cool and well-ventilated place. Store locked up. Post as a pesticide storage area. Store cylinders upright, secured to a rack or wall to prevent tipping. Keep away from flames and sparks. Keep away from heat and sources of ignition. Keep container tightly closed.
Materials to avoid	:	Aluminium, Magnesium, Zinc, Alkali metals, Strong bases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Form of exposure	Permissible concentration	Basis
bromomethane	74-83-9	TWA	1 ppm	ACGIH
		C	20 ppm 80 mg/m3	OSHA Z-1
		TWA	5 ppm 20 mg/m3	OSHA P0
chloromethane	74-87-3	TWA	50 ppm	ACGIH
		STEL	100 ppm	ACGIH
		TWA	100 ppm	OSHA Z-2
		CEIL	200 ppm	OSHA Z-2
		Peak	300 ppm	OSHA Z-2
		TWA	50 ppm 105 mg/m3	OSHA P0
		STEL	100 ppm 205 mg/m3	OSHA P0

Engineering measures : Use local ventilation to keep levels below established threshold values.
Adequate general ventilation is recommended when handling to control airborne levels.
Do not use in areas without adequate ventilation.
Use mechanical ventilation for general area control.

Personal protective equipment

Respiratory protection : Use a direct reading detection device for determining methyl bromide air concentrations. Detection devices must have a sensitivity of at least 1 ppm for methyl bromide. Device manufacturers instructions must be followed.
For protection from concentrations greater than 50 times the PEL, wear a NIOSH/MSHA approved self contained breathing apparatus (SCBA). All persons entering the affected area must wear a NIOSH/MSHA approved SCBA if the air concentrations of methyl bromide is unknown, or, if the methyl bromide air concentrations is measured at greater than 1ppm.
In emergencies such as a spill or leak, or when corrective action is needed to reduce air concentrations to acceptable levels, wear a SCBA and PPE required for potential contact with fumigant liquid.
Consult the OSHA respiratory protection information located at 29CFR1910.134 and the American National Standard Institue's Practices of Respiratory Protection Z88.2.

Eye protection : Full face shield or safety glasses with brow and temple shields. Do NOT wear goggles.
If full face respiratory protection is not required, wear full-face shield when handling liquid fumigant.

Skin and body protection : Loose-fitting or well ventilated long-sleeved shirt and pants. Shoes and socks. Do NOT wear jewelry, gloves, tight clothing, rubber protective clothing, or rubber boots when handling.

Hygiene measures	:	Wash thoroughly after handling. For personal hygiene purposes, use adequate clothing to prevent skin contact. Make sure piping is empty before doing maintenance work. All persons working with methyl bromide should be trained in the hazards, use of required respirator equipment, emergency procedures and in the proper use of methyl bromide as a fumigant where applicable.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	gas
Color	:	colourless
Odor	:	odourless
Odour Threshold	:	No data available
pH	:	No data available
Melting point/range	:	Not applicable
Boiling point/boiling range	:	3.56 °CMethyl bromide
Evaporation rate	:	Not applicable
Flash point	:	Not applicable
Upper explosion limit	:	ca. 15 %(V) Methyl bromide
Lower explosion limit	:	ca. 10 %(V) Methyl bromide
Vapour pressure	:	1,900 hPa (20 °C) 1420 mm Hg Methyl bromide
Relative vapour density	:	ca. 3.27Methyl bromide
Relative density	:	No data available
Bulk Density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	ca. 17.5 g/l Methyl bromide (20 °C)
Solubility in other solvents	:	No data available
Partition coefficient: n-octanol/water	:	No data available
Auto-ignition temperature	:	No data available

Thermal decomposition	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
		Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	No dangerous reaction known under conditions of normal use.
Chemical stability	:	No decomposition if stored and applied as directed.
Possibility of hazardous reactions	:	Will not occur.
Conditions to avoid	:	None known.
Incompatible materials	:	Aluminium Magnesium Zinc Alkali metals Strong bases
Hazardous decomposition products	:	Carbon oxides Hydrogen halides

SECTION 11. TOXICOLOGICAL INFORMATION

Acute oral toxicity (Product)	:	Acute toxicity estimate: 214 mg/kg Method: Calculation method
Acute inhalation toxicity (Product)	:	Acute toxicity estimate: Exposure time: 4 h Method: Calculation method
Skin irritation (Product)	:	Remarks: Irritating to skin.
Eye irritation (Product)	:	Remarks: Irritating to eyes.
Aspiration toxicity (Product)	:	No aspiration toxicity classification

Further information (Product) : Acute Health Hazard

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Toxicity to fish (Product) : Remarks:
No data available

Elimination information (persistence and degradability)

Bioaccumulation (Product) : Remarks:
No data available

Mobility (Product) : Remarks:
No data available

Biodegradability (Product) : Result: No data available

Further information on ecology

Ecotoxicology Assessment

Results of PBT assessment (Product)
This mixture contains no substance considered to be persistent, bioaccumulating and toxic (PBT).

Additional ecological information (Product) : Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
These products are toxic to fish and wildlife.Keep out of lakes, streams and ponds. Do not contaminate water by cleaning of equipment or disposal of wastes.

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues : Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of wastes in an approved waste disposal facility.
Do not contaminate ponds, waterways or ditches with chemical or used container.

SECTION 14. TRANSPORT INFORMATION

DOT

UN number	:	1062
Description of the goods	:	Methyl bromide
Class	:	2.3
Environmentally hazardous	:	no
		Poison Inhalation Hazard - Zone C

IATA

UN number	:	1062
Class	:	2.3
		Not permitted for transport

IMDG

UN number	:	1062
Description of the goods	:	METHYL BROMIDE
Class	:	2.3
EmS Number 1	:	F-C
EmS Number 2	:	S-U
Marine pollutant	:	no

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know Act

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
bromomethane	74-83-9	1000	1000

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
bromomethane	74-83-9	1000	1000

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 302 : The following components are subject to reporting levels established by SARA Title III, Section 302:
bromomethane 74-83-9

	bromomethane	74-83-9
SARA 313	: The following components are subject to reporting levels established by SARA Title III, Section 313:	
	bromomethane	74-83-9

California Prop 65 WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

bromomethane	74-83-9
chloromethane	74-87-3

The components of this product are reported in the following inventories:

US.TSCA	On TSCA Inventory
DSL	All components of this product are on the Canadian DSL.
AICS	On the inventory, or in compliance with the inventory
NZIoC	Not in compliance with the inventory
ENCS	On the inventory, or in compliance with the inventory
KECI	On the inventory, or in compliance with the inventory
PICCS	On the inventory, or in compliance with the inventory
IECSC	On the inventory, or in compliance with the inventory
CH INV	The formulation contains substances listed on the Swiss Inventory

SECTION 16. OTHER INFORMATION

Further information

Other Emergency Phone Number

Latin America:	Brazil	+55 113 711 9144
	All other countries	+44 (0) 1235 239 670
Mexico:		+52 555 004 8763

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

MATHESON
ask. . .The Gas Professionals™

Safety Data Sheet

Material Name METHYL CHLOROFORM **SDS ID: MAT14370**

* * *Section 1 - IDENTIFICATION* * *

Product Identifier: METHYL CHLOROFORM

Trade Names/Synonyms

MTG MSDS 219; 1,1,1-TRICHLOROETHANE; ALPHA-TRICHLOROETHANE; AEROTHENE TT; METHYLTRICHLOROMETHANE; METHYLCHLOROFORM; TRICHLOROMETHYLMETHANE; TRICHLOROETHANE; ETHANE, 1,1,1-TRICHLOROETHANE; CHLORTEN; 1,1,1-TRICHLORETHANE; UN 2831; C2H3Cl3

Chemical Family

halogenated, aliphatic

Recommended Use

industrial

Restrictions on Use

None known.

Manufacturer Information

MATHESON TRI-GAS, INC.
150 Allen Road, Suite 302
Basking Ridge, NJ 07920

General Information: 1-800-416-2505
Emergency #: 1-800-424-9300 (CHEMTREC)
Outside the US: 703-527-3887 (Call collect)

* * *Section 2 - HAZARDS IDENTIFICATION* * *

Classification in accordance with 29 CFR 1910.1200

Acute Toxicity (Inhalation), Category 4
Skin Corrosion / Irritation, Category 2
Eye Damage / Irritation, Category 2A
Toxic to Reproduction, Category 2
Specific Target Organ Toxicity - Single Exposure, Category 1 (central nervous system and heart)
Specific Target Organ Toxicity - Single Exposure, Category 3 (respiratory system)
Specific Target Organ Toxicity - Repeated Exposure, Category 1 (central nervous system, heart, and liver)
Specific Target Organ Toxicity - Repeated Exposure, Category 2 (brain, lungs, and nervous system)
Hazardous to the Aquatic Environment - Acute Hazard, Category 2
Hazardous to the Aquatic Environment - Chronic Hazard, Category 2
Hazardous for the ozone layer, Category 1

GHS LABEL ELEMENTS

Symbol(s)



Signal Word

DANGER

Hazard Statement(s)

Harmful if inhaled
Causes skin irritation
Causes serious eye irritation
Suspected of damaging fertility or the unborn child
Causes damage to central nervous system and heart.
May cause respiratory tract irritation.
Causes damage to central nervous system, heart, and liver through prolonged or repeated exposure.
May cause damage to brain, lungs, nervous system through prolonged or repeated exposure.
Toxic to aquatic life with long lasting effects
Harms public health and the environment by destroying ozone in the upper atmosphere

Precautionary Statement(s)

Prevention

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves and eye/face protection. Wash thoroughly after handling. Do not eat, drink or smoke when using this product. Avoid release to the environment.

Response

IF exposed: Call a POISON CENTER or doctor/physician. IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/physician if you feel unwell. IF ON SKIN: Wash with plenty of soap and water. If skin irritation occurs: Get medical advice/attention. Take off contaminated clothing and wash before reuse. IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention. Collect spillage.

Storage

Store in a well-ventilated place. Keep container tightly closed. Store locked up.

Disposal

Dispose of in accordance with applicable regulations.
Refer to manufacturer/supplier for information on recovery/recycling.

* * *Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS* * *

CAS	Component	Percent
71-55-6	METHYL CHLOROFORM	100

Component Related Regulatory Information

This product may be regulated, have exposure limits or other information identified as the following: Trichloroethane (25323-89-1).

* * *Section 4 - FIRST AID MEASURES* * *

Description of Necessary Measures

Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

Wash skin with soap and water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention, if needed. Thoroughly clean and dry contaminated clothing and shoes before reuse.

Eyes

Flush eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Then get immediate medical attention.

Ingestion

If vomiting occurs, keep head lower than hips to help prevent aspiration. If person is unconscious, turn head to side. Get medical attention immediately.

Most Important Symptoms/Effects

Acute

respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, central nervous system damage, heart damage

Delayed

central nervous system damage, heart damage, liver damage, reproductive effects, lung damage, brain damage, nervous system damage

Indication of Immediate Medical Attention and Special Treatment

For inhalation, consider oxygen.

* * *Section 5 - FIRE FIGHTING MEASURES* * *

Suitable Extinguishing Media

carbon dioxide, regular dry chemical, water spray

Large fires: Use dry chemical, carbon dioxide, alcohol-resistant foam or water spray.

Unsuitable Extinguishing Media

Do not scatter spilled material with high-pressure water streams.

Specific Hazards Arising from the Chemical

Slight fire hazard.

Hazardous Combustion Products

Combustion: hydrogen chloride, phosgene, oxides of carbon

Fire Fighting Measures

Move container from fire area if it can be done without risk. Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with water spray until well after the fire is out. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. Stay away from the ends of tanks. For tank, rail car or tank truck, evacuation radius: 800 meters (1/2 mile).

Special Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

* * *Section 6 - ACCIDENTAL RELEASE MEASURES* * *

Personal Precautions, Protective Equipment and Emergency Procedures

Wear personal protective clothing and equipment, see Section 8. Avoid release to the environment.

Methods and Materials for Containment and Cleaning Up

Avoid heat, flames, sparks and other sources of ignition. Eliminate all ignition sources if safe to do so. Stop leak if possible without personal risk. **Small spills:** Absorb with sand or other non-combustible material. Collect spilled material in appropriate container for disposal. **Large spills:** Dike for later disposal. Remove sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Notify Local Emergency Planning Committee and State Emergency Response Commission for release greater than or equal to RQ (U.S. SARA Section 304). If release occurs in the U.S. and is reportable under CERCLA Section 103, notify the National Response Center at (800)424-8802 (USA) or (202)426-2675 (USA).

* * *Section 7 - HANDLING AND STORAGE* * *

Precautions for Safe Handling

Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use personal protective equipment as required. Do not breathe vapor or mist. Use only outdoors or in a well-ventilated area. Wear protective gloves and eye/face protection. Wash thoroughly after handling. Do not eat, drink, or smoke when using this product. Avoid release to the environment.

Conditions for Safe Storage, including any Incompatibilities

Store and handle in accordance with all current regulations and standards. Store in a well-ventilated place. Keep container tightly closed. Store locked up. Store in a cool, dry place. Keep separated from incompatible substances.

Incompatibilities combustible materials, bases, metals, oxidizing materials

* * *Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION* * *

Component Exposure Limits

METHYL CHLOROFORM (71-55-6)

ACGIH:	350 ppm TWA
	450 ppm STEL
Europe:	100 ppm TWA; 555 mg/m3 TWA
	200 ppm STEL; 1110 mg/m3 STEL
OSHA (Final):	350 ppm TWA; 1900 mg/m3 TWA
OSHA (Vacated):	350 ppm TWA; 1900 mg/m3 TWA
	450 ppm STEL; 2450 mg/m3 STEL
NIOSH:	350 ppm Ceiling (15 min); 1900 mg/m3 Ceiling (15 min)

Component Biological Limit Values

METHYL CHLOROFORM (71-55-6)

ACGIH: 40 ppm Medium: end-exhaled air Time: prior to last shift of workweek Parameter: Methyl chloroform; 10 mg/L Medium: urine Time: end of workweek Parameter: Trichloroacetic acid (nonspecific, semi-quantitative); 30 mg/L Medium: urine Time: end of shift at end of workweek Parameter: Total trichloroethanol (nonspecific, semi-quantitative); 1 mg/L Medium: blood Time: end of shift at end of workweek Parameter: Total trichloroethanol (nonspecific)

IDLH

700 ppm

Appropriate Engineering Controls

Provide local exhaust or process enclosure ventilation system. Ensure compliance with applicable exposure limits.

Individual Protection Measures, such as Personal Protective Equipment

Eyes/Face Protection

Wear splash resistant safety goggles with a faceshield. Provide an emergency eye wash fountain and quick drench shower in the immediate work area.

Skin Protection

Wear appropriate chemical resistant clothing.

Glove Recommendations

Wear appropriate chemical resistant gloves.

Respiratory Protection

The following respirators and maximum use concentrations are drawn from NIOSH and/or OSHA.

700 ppm

Any supplied-air respirator.

Any self-contained breathing apparatus with a full facepiece.
Emergency or planned entry into unknown concentrations or IDLH conditions -
Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode.
Any supplied-air respirator with a full facepiece that is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive-pressure mode.
Escape -
Any air-purifying full-facepiece respirator (gas mask) with a chin-style, front-mounted or back-mounted organic vapor canister.
Any appropriate escape-type, self-contained breathing apparatus.

* * *Section 9 - PHYSICAL AND CHEMICAL PROPERTIES* * *

Physical State:	Liquid	**Appearance:**	clear, colorless liquid
Color:	colorless	**Physical Form:**	volatile liquid
Odor:	sweet odor	**Odor Threshold:**	44 - 100 ppm
pH:	Not available	**Melting/Freezing Point:**	-32 °C
Boiling Point:	74 °C	**Flash Point:**	>93.3 °C
Decomposition:	Not available	**Evaporation Rate:**	5.0 (butyl acetate=1)
LEL:	7.5 %	**UEL:**	12.5 %
Vapor Pressure:	100 mmHg @ 20 °C	**Henry's Law Constant:**	0.072 atm-cu m/mole @ 25°C
Vapor Density (air = 1):	4.55	**Specific Gravity (water=1):**	1.3390
Water Solubility:	0.078 % @ 25 °C	**Log KOW:**	2.49
KOC:	17823.79 estimated from water solubility	**Auto Ignition:**	537 °C
Viscosity:	0.858 cP @20 °C	**Volatility:**	100%
Molecular Weight:	133.40	**Molecular Formula:**	C-H3-C-Cl3

Other Property Information

No additional information is available.

Solvent Solubility

Soluble: acetone, benzene, chloroform, methanol, ethanol, carbon disulfide, ether, carbon tetrachloride, heptane

* * *Section 10 - STABILITY AND REACTIVITY* * *

Reactivity

No reactivity hazard is expected.

Chemical Stability

Stable at normal temperatures and pressure.

Possibility of Hazardous Reactions

Will not polymerize.

Conditions to Avoid

Avoid heat, flames, sparks and other sources of ignition. Containers may rupture or explode if exposed to heat.

Incompatible Materials

combustible materials, bases, metals, oxidizing materials

Hazardous Decomposition

Combustion: hydrogen chloride, phosgene, oxides of carbon

* * *Section 11 - TOXICOLOGICAL INFORMATION* * *

Acute and Chronic Toxicity

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

METHYL CHLOROFORM (71-55-6)

Dermal LD50 Rabbit >15800 mg/kg; Inhalation LC50 Rat 18000 ppm 4 h; Oral LD50 Rat >2000 mg/kg

RTECS Acute Toxicity (selected)

The components of this material have been reviewed, and RTECS publishes the following endpoints:

METHYL CHLOROFORM (71-55-6)

Inhalation: 24400 mg/m3 Inhalation Cat LC50; 29492 ppm/10 minute(s) Inhalation Mouse LC50; 3911 ppm/2 hour Inhalation Mouse LC50
20000 ppm/2 hour Inhalation Rat LC50; 14250 ppm/7 hour Inhalation Rat LC50; 17000 ppm/4 hour Inhalation Rat LC50

Acute Toxicity Level

METHYL CHLOROFORM (71-55-6)

Slightly Toxic: inhalation, dermal absorption, ingestion

Information on Likely Routes of Exposure

Inhalation

irritation, changes in blood pressure, nausea, vomiting, diarrhea, difficulty breathing, irregular heartbeat, headache, drowsiness, dizziness, mood swings, loss of coordination, blood disorders, heart disorders, kidney damage, liver damage, convulsions, unconsciousness, coma, heart damage, reproductive effects

Ingestion

irritation, nausea, vomiting, diarrhea, stomach pain, irregular heartbeat, headache, drowsiness, dizziness, disorientation, loss of coordination, kidney damage, liver damage, convulsions, unconsciousness, coma, reproductive effects

Skin Contact

irritation (possibly severe)

Eye Contact

irritation

Immediate Effects

respiratory tract irritation, skin irritation, eye irritation, central nervous system depression, central nervous system damage, heart damage

Delayed Effects

central nervous system damage, heart damage, liver damage, reproductive effects, brain damage, lung damage, nervous system damage

Medical Conditions Aggravated by Exposure

heart or cardiovascular disorders, kidney disorders, liver disorders, skin disorders and allergies

Irritation/Corrosivity Data

respiratory tract irritation, skin irritation, eye irritation

RTECS Irritation

The components of this material have been reviewed, and RTECS publishes the following endpoints:

METHYL CHLOROFORM (71-55-6)

450 ppm/8 hour Eyes Man; 100 mg Eyes Rabbit mild; 2 mg/24 hour Eyes Rabbit severe; 5 gm/12 day(s) intermittent Skin Rabbit mild; 20 mg/24 hour Skin Rabbit moderate

Local Effects

METHYL CHLOROFORM (71-55-6)

Irritant: inhalation, skin, eye

Target Organs

METHYL CHLOROFORM (71-55-6)

central nervous system

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Carcinogenicity

Component Carcinogenicity

METHYL CHLOROFORM (71-55-6)

ACGIH: A4 - Not Classifiable as a Human Carcinogen

IARC: Monograph 71 [1999]; Supplement 7 [1987]; Monograph 20 [1979] (Group 3 (not classifiable))

RTECS Mutagenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Reproductive Effects Data

Available data characterizes this substance as a reproductive hazard.

RTECS Reproductive Effects

The components of this material have been reviewed, and RTECS publishes the following endpoints:

METHYL CHLOROFORM (71-55-6)

2100 ppm Inhalation Rat TCLo (6 hour, pregnant 1-20 day(s)); 7000 ppm Inhalation Rat TCLo (3 hour, pregnant 13-19 day(s)); 43 mg/kg Oral Rat TDLo (pregnant 1-22 day(s), 21 day(s))

RTECS Tumorigenic

The components of this material have been reviewed, and RTECS publishes data for one or more components.

Additional Data

Alcohol may enhance the toxic effects. Stimulants such as epinephrine may induce ventricular fibrillation.

Specific Target Organ Toxicity - Single Exposure

central nervous system, heart, respiratory system

Specific Target Organ Toxicity - Repeated Exposure

central nervous system, heart, liver, brain, lungs, nervous system

Aspiration Hazard

Not expected to be an aspiration hazard.

* * *Section 12 - ECOLOGICAL INFORMATION* * *

Ecotoxicity

Toxic to aquatic life with long lasting effects.

Component Analysis - Aquatic Toxicity

METHYL CHLOROFORM (71-55-6)

Fish: 96 Hr LC50 Pimephales promelas: 35.2 - 50.7 mg/L [flow-through]; 96 Hr LC50 Lepomis macrochirus: 57 - 90 mg/L [static] (juvenile); 96 Hr LC50 Cyprinus carpio: 56 mg/L [flow-through]; 96 Hr LC50 Poecilia reticulata: 52.9 mg/L [flow-through]; 96 Hr LC50 Poecilia reticulata: 69.7 mg/L [static]; 96 Hr LC50 Pimephales promelas: 91 - 126 mg/L [static]; 96 Hr LC50 Oncorhynchus mykiss: 46 - 59 mg/L [static]

Algae: 96 Hr EC50 Pseudokirchneriella subcapitata: >500 mg/L

Invertebrate: 48 Hr LC50 Daphnia magna: >530 mg/L; 48 Hr EC50 Daphnia magna: 2384 mg/L; 48 Hr EC50 Daphnia magna: 9.7 - 12.8 mg/L [Static]

Persistence and Degradability

This material may biodegrade in soil and water.

Bioaccumulative Potential

Bioconcentration potential in aquatic organisms is low based on BCF value of 0.7-4.9.

Mobility

Expected to have high mobility in soil.

* * *Section 13 - DISPOSAL CONSIDERATIONS* * *

Disposal Methods

Dispose in accordance with all applicable regulations.

Component Waste Numbers

METHYL CHLOROFORM (71-55-6)

RCRA: waste number U226

* * *Section 14 - TRANSPORT INFORMATION* * *

US DOT Information

Shipping Name: 1,1,1-Trichloroethane
UN/NA #: UN2831 **Hazard Class:** 6.1 **Packing Group:** III
Required Label(s): 6.1

IMDG Information

Shipping Name: 1,1,1-Trichloroethane
UN #: UN2831 **Hazard Class:** 6.1 **Packing Group:** III
Required Label(s): 6.1

* * *Section 15 - REGULATORY INFORMATION* * *

Component Analysis

U.S. Federal Regulations

This material contains one or more of the following chemicals required to be identified under SARA Section 302/304 (40 CFR 355 Appendix A), SARA Section 313 (40 CFR 372.65), CERCLA (40 CFR 302.4), TSCA 12(b), and/or require an OSHA process safety plan.

METHYL CHLOROFORM (71-55-6)

SARA 313: 1.0 % de minimis concentration

CERCLA: 1000 lb final RQ; 454 kg final RQ

SARA 311/312 Hazardous Categories

Acute Health: Yes **Chronic Health:** Yes **Fire:** No **Pressure:** No **Reactive:** No

U.S. State Regulations

The following components appear on one or more of the following state hazardous substances lists:

Component	CAS	CA	MA	MN	NJ	PA
METHYL CHLOROFORM	71-55-6	Yes	Yes	Yes	Yes	Yes

Not regulated under California Proposition 65

Component Analysis - Inventory

Component	CAS	US	CA	EU	AU	PH	JP	KR	CN	NZ
METHYL CHLOROFORM	71-55-6	Yes	DSL	EIN	Yes	Yes	Yes	Yes	Yes	Yes

* * *Section 16 - OTHER INFORMATION* * *

NFPA Ratings: Health: 2 **Fire:** 1 **Reactivity:** 0

Hazard Scale: 0 = Minimal 1 = Slight 2 = Moderate 3 = Serious 4 = Severe

Key / Legend

ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSL - Domestic Substances List; EEC - European Economic Community; EINECS - European Inventory of Existing Commercial Chemical Substances; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; JP - Japan; Kow - Octanol/water partition coefficient; KR - Korea; LEL - Lower Explosive Limit; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PH - Philippines; RCRA - Resource Conservation and Recovery Act; RID - European Rail Transport; RTECS - Registry of Toxic Effects of Chemical Substances®; SARA - Superfund Amendments and Reauthorization Act; STEL - Short-term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; UEL - Upper Explosive Limit; US - United States

Other Information

Matheson Tri-Gas, Inc. makes no express or implied warranties, guarantees or representations regarding the product or the information herein, including but not limited to any implied warranty or merchantability or fitness for use. Matheson Tri-Gas, Inc. shall not be liable for any personal injury, property or other damages of any nature, whether compensatory, consequential, exemplary, or otherwise, resulting from any publication, use or reliance upon the information herein.

End of Sheet MAT14370

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Creation Date 27-Jan-2010 **Revision Date** 02-Oct-2015 **Revision Number** 2

1. Identification

Product Name **Methylene chloride**

Cat No. : **D37-1; D37-4; D37-20; D37-200; D37-200LC; D37-500; D37FB-19; D37FB-50; D37FB-115; D37FB-200; D37POP-19; D37POPB-50; D37POPB-200; D37RB-19; D37RB-50; D37RB-115; D37RB-200; D37RS-19; D37RS-28; D37RS-50; D37RS-115; D37RS-200; D37SK-4; D37SK-4LC; D37SS-28; D37SS-50; D37SS-115; D37SS-200; D37SS-1350**

Synonyms Dichloromethane; DCM

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Emergency Telephone Number
CHEMTREC®, Inside the USA: 800-424-9300
CHEMTREC®, Outside the USA: 001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 1B
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS), Respiratory system.	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver, Kidney, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
Causes skin irritation
Causes serious eye irritation

May cause respiratory irritation
May cause drowsiness or dizziness
May cause cancer
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)

WARNING! This product contains a chemical known in the State of California to cause cancer, birth defects or other reproductive harm.

3. Composition / information on ingredients

Component	CAS-No	Weight %
Methylene chloride	75-09-2	>99.5
Methyl alcohol	67-56-1	0 - 0.4
Cyclohexene	110-83-8	0 - 0.01
2-Methyl-2-butene	513-35-9	0 - 0.01

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects Breathing difficulties. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature 556 °C / 1032.8 °F

Explosion Limits
Upper 23 vol %
Lower 13 vol %
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Thermal decomposition can lead to release of irritating gases and vapors. Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2) Hydrogen chloride gas Phosgene
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Avoid contact with skin, eyes and clothing. Keep people away from and upwind of spill/leak.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Use only under a chemical fume hood.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Methylene chloride	TWA: 50 ppm	(Vacated) TWA: 500 ppm (Vacated) STEL: 2000 ppm (Vacated) Ceiling: 1000 ppm TWA: 25 ppm STEL: 125 ppm	IDLH: 2300 ppm
Methyl alcohol	TWA: 200 ppm STEL: 250 ppm Skin	(Vacated) TWA: 200 ppm (Vacated) TWA: 260 mg/m³ (Vacated) STEL: 250 ppm (Vacated) STEL: 325 mg/m³ Skin TWA: 200 ppm TWA: 260 mg/m³	IDLH: 6000 ppm TWA: 200 ppm TWA: 260 mg/m³ STEL: 250 ppm STEL: 325 mg/m³
Cyclohexene	TWA: 300 ppm	(Vacated) TWA: 300 ppm (Vacated) TWA: 1015 mg/m³ TWA: 300 ppm TWA: 1015 mg/m³	IDLH: 2000 ppm TWA: 300 ppm TWA: 1015 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Methylene chloride	TWA: 50 ppm TWA: 174 mg/m³	TWA: 100 ppm TWA: 330 mg/m³ STEL: 500 ppm STEL: 1740 mg/m³	TWA: 50 ppm
Methyl alcohol	TWA: 200 ppm TWA: 262 mg/m³ STEL: 250 ppm STEL: 328 mg/m³ Skin	TWA: 200 ppm TWA: 260 mg/m³ STEL: 250 ppm STEL: 310 mg/m³	TWA: 200 ppm STEL: 250 ppm Skin
Cyclohexene	TWA: 300 ppm TWA: 1010 mg/m³	TWA: 300 ppm TWA: 1015 mg/m³	TWA: 300 ppm

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	sweet
Odor Threshold	No information available
pH	Not applicable
Melting Point/Range	-97 °C / -142.6 °F
Boiling Point/Range	39 °C / 102.2 °F
Flash Point	No information available

Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	23 vol %
Lower	13 vol %
Vapor Pressure	20 mmHg @ 3502°C
Vapor Density	2.93 (Air = 1.0)
Specific Gravity	1.33
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	556 °C / 1032.8 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C H2 Cl2
Molecular Weight	84.93

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat.

Incompatible Materials Strong oxidizing agents, Strong acids, Amines

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Hydrogen chloride gas, Phosgene

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Methylene chloride	> 2000 mg/kg (Rat)	> 2000 mg/kg (Rat)	53 mg/L (Rat) 6 h 76000 mg/m³ (Rat) 4 h
Methyl alcohol	LD50 = 6200 mg/kg (Rat)	LD50 = 15800 mg/kg (Rabbit)	64000 ppm (Rat) 4 h 83.2 mg/L (Rat) 4 h
Cyclohexene	LD50 = 2400 µL/kg (Rat)	>200 mg/kg (Rat)	>21.6 mg/L/4h (rat)
2-Methyl-2-butene	700-2600 mg/kg (Rat)	>2000 mg/kg (Rat)	LC50 > 61000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Methylene chloride	75-09-2	Group 2A	Reasonably Anticipated	A3	X	A3
Methyl alcohol	67-56-1	Not listed	Not listed	Not listed	Not listed	Not listed

Cyclohexene	110-83-8	Not listed	Not listed	Not listed	Not listed	Not listed
2-Methyl-2-butene	513-35-9	Not listed	Not listed	Not listed	Not listed	Not listed

IARC: (International Agency for Research on Cancer)

IARC: (International Agency for Research on Cancer)
Group 1 - Carcinogenic to Humans
Group 2A - Probably Carcinogenic to Humans
Group 2B - Possibly Carcinogenic to Humans

NTP: (National Toxicity Program)

NTP: (National Toxicity Program)
Known - Known Carcinogen
Reasonably Anticipated - Reasonably Anticipated to be a Human Carcinogen

ACGIH: (American Conference of Governmental Industrial Hygienists)

A1 - Known Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Animal Carcinogen
ACGIH: (American Conference of Governmental Industrial Hygienists)

Mexico - Occupational Exposure Limits - Carcinogens

Mexico - Occupational Exposure Limits - Carcinogens
A1 - Confirmed Human Carcinogen
A2 - Suspected Human Carcinogen
A3 - Confirmed Animal Carcinogen
A4 - Not Classifiable as a Human Carcinogen
A5 - Not Suspected as a Human Carcinogen

Mutagenic Effects Mutagenic effects have occured in microorganisms.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS) Respiratory system
STOT - repeated exposure Liver Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting
Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Methylene chloride	EC50:>660 mg/L/96h	Pimephales promelas: LC50:193 mg/L/96h	EC50: 1 mg/L/24 h EC50: 2.88 mg/L/15 min	EC50: 140 mg/L/48h
Methyl alcohol	Not listed	Pimephales promelas: LC50 > 10000 mg/L 96h	EC50 = 39000 mg/L 25 min EC50 = 40000 mg/L 15 min EC50 = 43000 mg/L 5 min	EC50 > 10000 mg/L 24h
Cyclohexene	Not listed	Poecillia reticulata: 7.1 mg/L/96h	Not listed	Daphnia: EC50: 5.3 mg/L/48h
2-Methyl-2-butene	Not listed	Not listed	Not listed	EC50: = 3 mg/L, 48h (Daphnia magna)

Persistence and Degradability Persistence is unlikely based on information available.
Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Methylene chloride	1.25
Methyl alcohol	-0.74

Cyclohexene	3.27

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Methylene chloride - 75-09-2	U080	-
Methyl alcohol - 67-56-1	U154	-

14. Transport information

DOT

UN-No UN1593
Proper Shipping Name DICHLOROMETHANE
Hazard Class 6.1
Packing Group III

TDG

UN-No UN1593
Proper Shipping Name DICHLOROMETHANE
Hazard Class 6.1
Packing Group III

IATA

UN-No UN1593
Proper Shipping Name Dichloromethane
Hazard Class 6.1
Packing Group III

IMDG/IMO

UN-No UN1593
Proper Shipping Name Dichloromethane
Hazard Class 6.1
Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Methylene chloride	X	X	-	200-838-9	-		X	X	X	X	X
Methyl alcohol	X	X	-	200-659-6	-		X	X	X	X	X
Cyclohexene	X	X	-	203-807-8	-		X	X	X	X	X
2-Methyl-2-butene	X	X	-	208-156-3	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b)

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Methylene chloride	75-09-2	>99.5	0.1
Methyl alcohol	67-56-1	0 - 0.4	1.0

SARA 311/312 Hazard Categories

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Methylene chloride	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Methylene chloride	X		-
Methyl alcohol	X		-

OSHA Occupational Safety and Health Administration

Component	Specifically Regulated Chemicals	Highly Hazardous Chemicals
Methylene chloride	125 ppm STEL 12.5 ppm Action Level 25 ppm TWA	-

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Methylene chloride	1000 lb 1 lb	-
Methyl alcohol	5000 lb	-

California Proposition 65 This product contains the following proposition 65 chemicals

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Methylene chloride	75-09-2	Carcinogen	200 µg/day 50 µg/day	Carcinogen
Methyl alcohol	67-56-1	Developmental	-	Developmental

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Methylene chloride	X	X	X	X	X
Methyl alcohol	X	X	X	X	X
Cyclohexene	X	X	X	-	X
2-Methyl-2-butene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials
D2A Very toxic materials



16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 27-Jan-2010
Revision Date 02-Oct-2015
Print Date 02-Oct-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.15
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : *tert*-Butyl methyl ether

Product Number : 306975
Brand : Sigma-Aldrich
Index-No. : 603-181-00-X
CAS-No. : 1634-04-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 2), H225
Skin irritation (Category 2), H315

For the full text of the H-Statements mentioned in this Section, see Section 16.

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Danger

Hazard Statements

H225	Highly flammable liquid and vapor.
H315	Causes skin irritation.

Precautionary Statements

P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	MTBE Methyl tert-butyl ether
Formula	:	$C_5H_{12}O$
Molecular weight	:	88.15 g/mol
CAS-No.	:	1634-04-4
EC-No.	:	216-653-1
Index-No.	:	603-181-00-X

Component	Classification	Concentration
tert-butyl methyl ether		
	Flam. Liq. 2; Skin Irrit. 2; H225, H315	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Pay attention to flashback.
Vapors are heavier than air and may spread along floors.
Development of hazardous combustion gases or vapours possible in the event of fire.
Forms explosive mixtures with air at ambient temperatures.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®).
Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
tert-butyl methyl ether	1634-04-4	TWA	50 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		PEL	40 ppm 144 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 120 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter type AX
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains. Risk of explosion.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Color: colorless
b)	Odor	characteristic
c)	Odor Threshold	0.053 ppm
d)	pH	No data available
e)	Melting point/freezing point	Melting point: -108.6 °C (-163.5 °F) at 1,013 hPa
f)	Initial boiling point and boiling range	55 - 56 °C 131 - 133 °F - lit.
g)	Flash point	-28 °C (-18 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 8.5 %(V) Lower explosion limit: 1.6 %(V)
k)	Vapor pressure	330 hPa at 25 °C (77 °F) - OECD Test Guideline 104
l)	Vapor density	No data available
m)	Density	0.74 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	0.7420 °C
n)	Water solubility	42 g/l at 20 °C (68 °F) - OECD Test Guideline 105
o)	Partition coefficient: n-octanol/water	log Pow: 1.06 at 20 °C (68 °F) - OECD Test Guideline 107 - Bioaccumulation is not expected.
p)	Autoignition temperature	460 °C (860 °F) at 1013.0 hPa - DIN 51794
q)	Decomposition temperature	Distillable in an undecomposed state at normal pressure.
r)	Viscosity	0.409 mm2/s at 40 °C (104 °F) - OECD Test Guideline 114 - 0.464 mm2/s at 20 °C (68 °F) - OECD Test Guideline 114 -
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

Surface tension	72.5 mN/m at 1.07g/l at 21.5 °C (70.7 °F) - Surface tension

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SECTION 10: Stability and reactivity

10.1 Reactivity
Vapors may form explosive mixture with air.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Oxidizing agents
Strong acids
halogens
Strong bases

10.4 Conditions to avoid
Heat, flames and sparks.
Warming.

10.5 Incompatible materials
rubber, various plastics

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 401)
Symptoms: Nausea, Vomiting, Pulmonary failure possible after aspiration of vomit., Aspiration may cause pulmonary edema and pneumonitis.
LC50 Inhalation - Rat - male and female - 4 h - 85 mg/l - vapor

(OECD Test Guideline 403)
Symptoms: Possible damages:, mucosal irritations
LD50 Dermal - Rat - male and female - > 2,000 mg/kg
(OECD Test Guideline 402)

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 4 h
(OECD Test Guideline 404)
Remarks: Drying-out effect resulting in rough and chapped skin.

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

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(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximization Test - Guinea pig
Result: negative
(OECD Test Guideline 406)

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster lung cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Test Type: Mutagenicity (mammal cell test): micronucleus.
Test system: mouse lymphoma cells
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 473
Result: negative

Test Type: unscheduled DNA synthesis assay
Species: Mouse
Cell type: Liver cells
Application Route: inhalation (vapor)
Method: OECD Test Guideline 486
Result: negative

Test Type: Micronucleus test
Species: Mouse
Cell type: Bone marrow
Application Route: inhalation (vapor)
Method: US-EPA
Result: negative

Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Species: Rat
Cell type: Bone marrow
Application Route: inhalation (vapor)
Method: US-EPA
Result: negative

Test Type: Transgenic rodent somatic cell gene mutation assay
Species: Rat
Cell type: Bone marrow
Application Route: inhalation (vapor)
Method: OECD Test Guideline 488
Result: negative

Carcinogenicity

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IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Rat - male and female - Oral - 90 d - NOAEL (No observed adverse effect level) - 3,000 mg/kg
Remarks: Subchronic toxicity

RTECS: KN5250000
Nausea, Vomiting, Dizziness, Central nervous system depression, Aspiration or inhalation may cause chemical pneumonitis., MTBE (methyl-tert-butyl ether) is reported to metabolize to tert-butyl alcohol and formaldehyde by microsomal demethylation, MTBE (methyl-tert-butyl ether) should be considered a "potential human carcinogen" due to an increase in leydig interstitial cell tumors of testes in male rats and an increase in lymphomas, leukemias, and uterine sarcomas in female rats., In another unpublished study MTBE was shown to be carcinogenic due to "increased incidence of a rare type of kidney tumor" in male rats and an "increase in the incidence of hepatocellular adenomas" in female mice.
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Systemic effects:

After absorption of large quantities:

somnolence
Dizziness
agitation, spasms
CNS disorders
narcosis
Unconsciousness

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

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SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	semi-static test LC50 - Menidia beryllina - 574 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	flow-through test EC50 - Americamysis bahia (Mysid) - 187 mg/l - 96 h (US-EPA OPPTS 850.1035)
Toxicity to algae	static test IC50 - Pseudokirchneriella subcapitata (green algae) - 491 mg/l - 96 h
Toxicity to bacteria	static test EC10 - Pseudomonas putida - 710 mg/l - 18 h Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Pimephales promelas (fathead minnow) - 299 mg/l - 31 d Remarks: (ECHA)
	flow-through test NOEC - Pimephales promelas (fathead minnow) - 450 mg/l - 31 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	flow-through test NOEC - Daphnia magna (Water flea) - 51 mg/l - 21 d (OPPTS 850.1300)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 0 % - Not readily biodegradable. (OECD Test Guideline 301D)

12.3 Bioaccumulative potential

Bioaccumulation	Cyprinus carpio (Carp) - 28 d at 25 °C(tert-butyl methyl ether) Bioconcentration factor (BCF): 1.5

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 2398 Class: 3 Packing group: II
Proper shipping name: Methyl tert-butyl ether
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 2398 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: METHYL tert-BUTYL ETHER

IATA
UN number: 2398 Class: 3 Packing group: II
Proper shipping name: Methyl tert-butyl ether

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
tert-butyl methyl ether	1634-04-4	1000	1000

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Fire Hazard
Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

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tert-butyl methyl ether	1634-04-4	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

tert-butyl methyl ether 1634-04-4

Pennsylvania Right To Know

tert-butyl methyl ether 1634-04-4

Maine Chemicals of High Concern

tert-butyl methyl ether 1634-04-4

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.15 Revision Date: 09/07/2024 Print Date: 09/08/2024

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SAFETY DATA SHEET

Version 5.5
Revision Date 06/02/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *m*-Xylene

Product Number : 95670
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 108-38-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H226 Flammable liquid and vapour.
H304 May be fatal if swallowed and enters airways.
H312 Harmful in contact with skin.
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.

H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,3-Dimethylbenzene
Formula	:	C_8H_{10}
Molecular weight	:	106.17 g/mol
CAS-No.	:	108-38-3
EC-No.	:	203-576-3
Index-No.	:	601-022-00-9

Hazardous components

Component	Classification	Concentration
m-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 3; Aquatic Chronic 3; H226, H304, H312, H315, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
m-Xylene	108-38-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section)		

		Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
m-Xylene	108-38-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1,500.0000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -48 °C (-54 °F) - lit.
f)	Initial boiling point and boiling range	138 - 139 °C (280 - 282 °F) - lit.
g)	Flash point	25.0 °C (77.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	8.0 hPa (6.0 mmHg) at 20.0 °C (68.0 °F) 21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F)
l)	Vapour density	No data available
m)	Relative density	0.868 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.2 at 20 °C (68 °F)
p)	Auto-ignition temperature	465.0 °C (869.0 °F) 528.0 °C (982.4 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 6,602 mg/kg
(OECD Test Guideline 401)

LC50 Inhalation - Rat - male - 4 h - 6700 ppm
(Directive 67/548/EEC, Annex V, B.2.)

LD50 Dermal - Rabbit - male - 12,126 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Severe eye irritation - 24 h

Respiratory or skin sensitisation
- Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
No data available

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (m-Xylene)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: ZE2275000

Liver injury may occur., Kidney injury may occur., Blood disorders, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	mortality LC50 - Fish - 11.23 mg/l - 96 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	Remarks: No data available
Toxicity to algae	Remarks: No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
m-Xylene	108-38-3	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.

H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 06/02/2016 Print Date: 06/21/2016

SAFETY DATA SHEET

Revision Date 03-May-2012 **Revision Number** 2

SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

Product Identifier

Product Description: **n-Butylbenzene**
Cat No. **107850000; 107850050; 107850500; 107852500**
Synonyms 1-Phenylbutane

Relevant identified uses of the substance or mixture and uses advised against

Recommended Use Laboratory chemicals
Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium
E-mail address begel.sdsdesk@thermofisher.com

Emergency Telephone Number

For information in the US, call: 001-800-ACROS-01
For information in Europe, call: +32 14 57 52 11

Emergency Number, Europe: +32 14 57 52 99
Emergency Number, US: 001-201-796-7100

CHEMTREC Phone Number, US: 001-800-424-9300
CHEMTREC Phone Number, Europe: 001-703-527-3887

SECTION 2. HAZARDS IDENTIFICATION

Classification of the substance or mixture

REGULATION (EC) No 1272/2008

Flammable liquids.	Category 3

Classification according to EU Directives 67/548/EEC or 1999/45/EC

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16

R-phrase(s) none

Label Elements

SECTION 2. HAZARDS IDENTIFICATION



Signal Word **Warning**

Hazard Statements
H226 - Flammable liquid and vapor

Precautionary Statements - EU (§28, 1272/2008)
P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking

Other Hazards

No information available.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	EC-No.	Weight %	CAS-No	67/548/EEC Classification	CLP Classification - Regulation (EC) No 1272/2008	REACH No.
Butyl benzene 104-51-8	EEC No. 203-209-7	> 99	104-51-8	-	Flam. Liq. 3 (H226)	-

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16

SECTION 4. FIRST AID MEASURES

Description of first aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Ingestion Do not induce vomiting. Clean mouth with water. Aspiration hazard. Get medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Obtain medical attention.

Notes to Physician Treat symptomatically

SECTION 5. FIRE-FIGHTING MEASURES

Extinguishing media

Suitable Extinguishing Media
Water spray. Carbon dioxide (CO_2). Dry chemical. Use water spray to cool unopened containers. chemical foam. Do not use a solid water stream as it may scatter and spread fire.

Extinguishing media which must not be used for safety reasons
No information available.

Special hazards arising from the substance or mixture

Combustible material. Flammable. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Advice for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures

Ensure adequate ventilation

Environmental precautions

Prevent further leakage or spillage if safe to do so

Methods and material for containment and cleaning up

Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment.

SECTION 7. HANDLING AND STORAGE

Precautions for Safe Handling

Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Use explosion-proof equipment. Use only non-sparking tools.

Conditions for safe storage, including any incompatibilities

Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep away from heat and sources of ignition.

Specific End Uses

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters

Exposure limits	This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Biological limit values	This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies.
Derived No Effect Level (DNEL)	No information available.
Predicted No Effect Concentration (PNEC)	No information available.

Exposure controls

Engineering Measures	Ensure adequate ventilation, especially in confined areas
Personal protective equipment	
Eye Protection	Goggles
Hand Protection	Protective gloves
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced
Hygiene Measures	Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	No information available.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Physical State	Liquid
Appearance	Colorless
odor	odorless
pH	No information available.
Vapor Pressure	1.33 hPa @ 23 °C
Vapor Density	4.6
Boiling Point/Range	183°C / 361.4°F@ 760 mmHg
Melting Point/Range	-88°C / -126.4°F
Flash Point	59°C / 138.2°F
Autoignition Temperature	412°C / 773.6°F
Explosion Limits	
Lower	0.8
Upper	5.8
Water Solubility	Insoluble
Specific Gravity	0.860
Molecular Formula	C10 H14
Molecular Weight	134.22

SECTION 10. STABILITY AND REACTIVITY

Reactivity

Chemical Stability

Stable under normal conditions.

Possibility of Hazardous Reactions

Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions .	No information available.

Conditions to Avoid

Keep away from open flames, hot surfaces and sources of ignition, Incompatible products.

Incompatible Materials

Strong oxidizing agents, oxygen.

Hazardous Decomposition Products

Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11. TOXICOLOGICAL INFORMATION

Information on Toxicological Effects

Acute Toxicity

Product Information	No acute toxicity information is available for this product

Component Information

Chronic Toxicity

Carcinogenicity	There are no known carcinogenic chemicals in this product
Sensitization	No information available.
Mutagenic Effects	No information available
Reproductive Effects	No information available.
Developmental Effects	No information available.
Target Organs	No information available.
Other Adverse Effects	The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information

Endocrine Disruptor Information

SECTION 11. TOXICOLOGICAL INFORMATION

Component	EU - Endocrine Disrupters Candidate List	EU - Endocrine Disruptors - Evaluated Substances	Japan - Endocrine Disruptor Information
Butyl benzene	Group III Chemical		

SECTION 12. ECOLOGICAL INFORMATION

Toxicity

Ecotoxicity effects Contains no substances known to be hazardous to the environment or that are not degradable in waste water treatment plants

Persistence and degradability

No information available

Bioaccumulative potential

No information available.

Component	log Pow
Butyl benzene	4.2

Mobility in soil

Results of PBT and vPvB assessment

Other adverse effects

No information available

SECTION 13. DISPOSAL CONSIDERATIONS

Waste treatment methods

Waste from Residues / Unused Products Dispose of in accordance with local regulations

Contaminated Packaging Empty containers should be taken to local recyclers for disposal

SECTION 14. TRANSPORT INFORMATION

IMDG/IMO

SECTION 14. TRANSPORT INFORMATION

UN-No	2709
Hazard Class	3
Packing Group	III
Proper Shipping Name	BUTYLBENZENES

ADR

UN-No	2709
Hazard Class	3
Packing Group	III
Proper Shipping Name	BUTYLBENZENES

IATA

UN-No	2709
Hazard Class	3
Packing Group	III
Proper Shipping Name	BUTYLBENZENES

SECTION 15. REGULATORY INFORMATION

Safety, health and environmental regulations/legislation specific for the substance or mixture

International Inventories

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	CHINA	AICS	KECL
Butyl benzene	203-209-7	-		X	X	-	X	X	X	X	-

Legend

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
PICCS - Philippines Inventory of Chemicals and Chemical Substances
ENCS - Japan Existing and New Chemical Substances
CHINA - China Inventory of Existing Chemical Substances
AICS - Inventory of Chemical Substances
KECL - Existing and Evaluated Chemical Substances

Chemical Safety Assessment

SECTION 16. OTHER INFORMATION

Full text of R-phrases referred to under sections 2 and 3
No information available.

Revision Date 03-May-2012
Revision Summary

Reason for revision Not applicable
This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006
Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

SAFETY DATA SHEET

Creation Date 26-Oct-2009 **Revision Date** 02-Apr-2014 **Revision Number** 1

1. Identification

Product Name **n-Hexane**

Cat No. : **AC326920000; AC326920010; AC326920025; AC326921000; AC326922500**

Synonyms Hex

Recommended Use Laboratory chemicals

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 /
Europe call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 /
Europe: +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 /
Europe:001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 2
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Reproductive Toxicity	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Respiratory system, Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Liver, Heart, Blood.	
Aspiration Toxicity	Category 1

Label Elements

Signal Word
Danger

Hazard Statements
Highly flammable liquid and vapor

May be fatal if swallowed and enters airways
Causes skin irritation
Causes serious eye irritation
May cause respiratory irritation
May cause drowsiness or dizziness
Suspected of damaging fertility
Causes damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Keep cool
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
If skin irritation occurs: Get medical advice/attention
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Wash contaminated clothing before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention.
Ingestion
IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Do NOT induce vomiting
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep container tightly closed
Disposal
Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Haz/Non-haz

Component	CAS-No	Weight %
Hexane	110-54-3	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Obtain medical attention. Aspiration into lungs can produce severe lung damage.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately. If vomiting occurs, lean victim forward to reduce the risk of aspiration.

Most important symptoms/effects Breathing difficulties. . Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

Notes to Physician Treat symptomatically.

5. Fire-fighting measures

Suitable Extinguishing Media CO_2, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

Unsuitable Extinguishing Media Water may be ineffective, This material is lighter than water and insoluble in water. The fire could easily be spread by the use of water in an area where the water cannot be contained.

Flash Point -22°C / -7.6°F

Method - No information available

Autoignition Temperature 223°C / 433.4°F

Explosion Limits

Upper 7.5 vol %

Lower 1.1 vol %

Sensitivity to Mechanical Impact No information available

Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

Hazardous Combustion Products Carbon monoxide (CO), Carbon dioxide (CO_2).

Protective Equipment and Precautions for Firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	3	0	N/A

6. Accidental release measures

Personal Precautions Use personal protective equipment. Ensure adequate ventilation. Evacuate personnel to safe areas. Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Soak up with inert absorbent material. Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Take precautionary measures against static discharges.

7. Handling and storage

Handling Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist. Keep away from open flames, hot surfaces and sources of ignition. Use only non-sparking tools. Use explosion-proof equipment. Take precautionary measures against static discharges. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Flammables area.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Hexane	TWA: 50 ppm Skin	(Vacated) TWA: 50 ppm (Vacated) TWA: 180 mg/m^3 TWA: 500 ppm TWA: 1800 mg/m^3	IDLH: 1100 ppm TWA: 50 ppm TWA: 180 mg/m^3

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Hexane	TWA: 50 ppm TWA: 176 mg/m^3 Skin	TWA: 50 ppm TWA: 176 mg/m^3	TWA: 50 ppm Skin

Legend
ACGIH *- American Conference of Governmental Hygienists*
OSHA *- Occupational Safety and Health Administration*
NIOSH IDLH: *The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health*

Engineering Measures Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location. Use explosion-proof electrical/ventilating/lighting/equipment.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	Petroleum distillates
Odor Threshold	No information available.
pH	No information available.
Melting Point/Range	-95°C / -139°F
Boiling Point/Range	69°C / 156.2°F@ 760 mmHg
Flash Point	-22°C / -7.6°F
Evaporation Rate	No information available.
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	
Upper	7.5 vol %
Lower	1.1 vol %
Vapor Pressure	160 mbar @ 20 °C
Vapor Density	2.97
Relative Density	0.659
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	223°C / 433.4°F
Decomposition temperature	No information available.
Viscosity	0.31 mPa s at 20 °C
Molecular Formula	C6 H14
Molecular Weight	86.18

10. Stability and reactivity

Reactive Hazard None known, based on information available.

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Heat, flames and sparks. Exposure to light. Keep away from open flames, hot surfaces and sources of ignition.

Incompatible Materials Strong oxidizing agents, Halogens

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur

Hazardous Reactions None under normal processing

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Hexane	25 g/kg (Rat)	3000 mg/kg (Rabbit)	48000 ppm (Rat) 4 h

Toxicologically Synergistic Products No information available.

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available.

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Hexane	110-54-3	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Mutagenic effects have occurred in experimental animals.

Reproductive Effects Experiments have shown reproductive toxicity effects on laboratory animals.

Developmental Effects Developmental effects have occurred in experimental animals.

Teratogenicity Teratogenic effects have occurred in experimental animals..

STOT - single exposure Respiratory system, Central nervous system (CNS).

STOT - repeated exposure Liver, Heart, Blood.

Aspiration hazard No information available.

Symptoms / effects, both acute and delayed Symptoms of overexposure may be headache, dizziness, tiredness, nausea and vomiting. Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting.

Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals.. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Hexane	Not listed	2.1 - 2.98 mg/L LC50 96 h	Not listed	EC50: 3.87 mg/L/48h

Persistence and Degradability Persistence is unlikely, based on information available.

Bioaccumulation/ Accumulation No information available

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Hexane	4.11

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No	UN1208
Proper Shipping Name	Hexanes
Hazard Class	3
Packing Group	II

TDG

UN-No	UN1208
Proper Shipping Name	HEXANES
Hazard Class	3
Packing Group	II

IATA

UN-No	UN1208
Proper Shipping Name	Hexanes
Hazard Class	3
Packing Group	II

IMDG/IMO

UN-No	UN1208
Proper Shipping Name	Hexanes
Hazard Class	3
Packing Group	II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Hexane	X	X	-	203-777-6	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Hexane	110-54-3	>95	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	Yes
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act Not applicable

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Hexane	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Hexane	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals.

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Hexane	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	Y
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

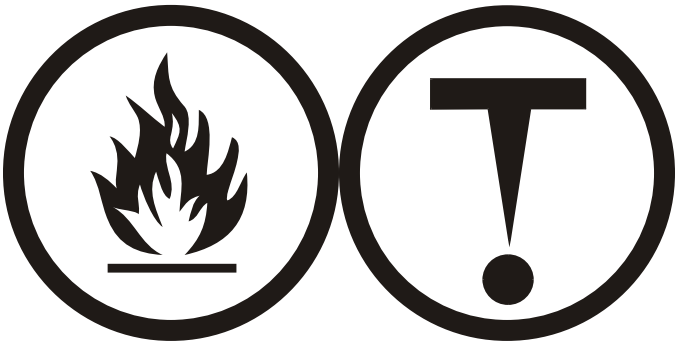
U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade Serious risk, Grade 3

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR.

WHMIS Hazard Class B2 Flammable liquid
D2A Very toxic materials



16. Other information

Prepared By	Regulatory Affairs Thermo Fisher Scientific Email: EMSDS.RA@thermofisher.com
Creation Date	26-Oct-2009
Revision Date	02-Apr-2014
Print Date	02-Apr-2014
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Creation Date 04-Oct-2010 **Revision Date** 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Nickel, powder**

Cat No. : **AC193610000; AC193610250; AC193611000; AC193615000**

Synonyms Raney alloy

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Sensitization	Category 1
Carcinogenicity	Category 2
Specific target organ toxicity - (repeated exposure)	Category 1
Target Organs - Kidney, Blood.	

Label Elements

Signal Word
Danger

Hazard Statements
May cause an allergic skin reaction
Causes damage to organs through prolonged or repeated exposure
Suspected of causing cancer



Precautionary Statements

Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Wear protective gloves/protective clothing/eye protection/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Contaminated work clothing should not be allowed out of the workplace
Response
IF exposed or concerned: Get medical attention/advice
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation or rash occurs: Get medical advice/attention
Wash contaminated clothing before reuse
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Harmful to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Nickel powder	7440-02-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Immediate medical attention is required.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Do not use mouth-to-mouth resuscitation if victim ingested or inhaled the substance; induce artificial respiration with a respiratory medical device. Immediate medical attention is required.

Ingestion Do not induce vomiting. Call a physician or Poison Control Center immediately.

Most important symptoms/effects May cause allergic skin reaction. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature 400 °C / 752 °F
Explosion Limits
Upper No data available
Lower No data available

Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Combustible material.

Hazardous Combustion Products
Nickel oxides.
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
3	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Keep people away from and upwind of spill/leak. Evacuate personnel to safe areas. Avoid dust formation.

Environmental Precautions Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling Use only under a chemical fume hood. Wear personal protective equipment. Do not get in eyes, on skin, or on clothing. Avoid dust formation. Do not breathe vapors/dust. Do not ingest.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Nickel powder	TWA: 1.5 mg/m³	(Vacated) TWA: 1 mg/m³ TWA: 1 mg/m³	IDLH: 10 mg/m³ TWA: 0.015 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Nickel powder	TWA: 1 mg/m³	TWA: 1 mg/m³	TWA: 1 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Use only under a chemical fume hood. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Brown
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	1455 °C / 2651 °F
Boiling Point/Range	2730 °C / 4946 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 1810 °C
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	400 °C / 752 °F
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Ni
Molecular Weight	58.7

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Nickel oxides

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Nickel powder	9000 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization May cause sensitization by skin contact Nickel and nickel compounds may cause a form of dermatitis known as nickel itch. May cause an allergic skin reaction

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Nickel powder	7440-02-0	Group 2B	Reasonably Anticipated	Not listed	X	Not listed

IARC: (International Agency for Research on Cancer) *Group 2B - Possibly Carcinogenic to Humans*

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure Kidney Blood

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain or flushing
Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity
Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Do not empty into drains. Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Nickel powder	0.18 mg/L EC50 = 72 h 0.174 - 0.311 mg/L EC50 96 h	10.4 mg/L LC50 96 h 1.3 mg/L LC50 96 h 100 mg/L LC50 96 h	Not listed	1 mg/L EC50 = 48 h 100 mg/L EC50 > 48 h

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- **UN-No** UN3089
- **Proper Shipping Name** METAL POWDERS, FLAMMABLE, N.O.S.
- **Hazard Class** 4.1
- **Packing Group** II

TDG
- **UN-No** UN3089
- **Proper Shipping Name** METAL POWDERS, FLAMMABLE, N.O.S.
- **Hazard Class** 4.1
- **Packing Group** II

IATA

UN-No	3089
Proper Shipping Name	METAL POWDERS, FLAMMABLE, N.O.S.
Hazard Class	4.1
Packing Group	II

IMDG/IMO

UN-No	3089
Proper Shipping Name	METAL POWDERS, FLAMMABLE, N.O.S.
Hazard Class	4.1
Packing Group	II

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Nickel powder	X	X	-	231-111-4	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Nickel powder	7440-02-0	>95	0.1

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Nickel powder	-	-	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Nickel powder	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive

Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Nickel powder	100 lb	-

California Proposition 65 This product contains the following Proposition 65 chemicals:

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Nickel powder	7440-02-0	Carcinogen	-	Carcinogen

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Nickel powder	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D2A Very toxic materials



16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 04-Oct-2010
Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 4.9
Revision Date 05/27/2016
Print Date 05/28/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Nitrobenzene

Product Number : 252379
Brand : Sigma-Aldrich
Index-No. : 609-003-00-7

CAS-No. : 98-95-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311
Carcinogenicity (Category 2), H351
Reproductive toxicity (Category 1B), H360
Specific target organ toxicity - repeated exposure, Inhalation (Category 1), Blood, H372
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H227 Combustible liquid.
H301 + H311 + H331 Toxic if swallowed, in contact with skin or if inhaled
H351 Suspected of causing cancer.
H360 May damage fertility or the unborn child.
H372 Causes damage to organs (Blood) through prolonged or repeated

	exposure if inhaled.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P311	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Rapidly absorbed through skin.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	$C_6H_5NO_2$
Molecular weight	:	123.11 g/mol
CAS-No.	:	98-95-3
EC-No.	:	202-716-0
Index-No.	:	609-003-00-7

Hazardous components

Component	Classification	Concentration
Nitrobenzene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Flam. Liq. 4; Acute Tox. 3; Carc. 2; Repr. 1B; STOT RE 1; Aquatic Acute 3; Aquatic Chronic 3; H227, H301 + H311 + H331, H351, H360, H372, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Store under nitrogen.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Nitrobenzene	98-95-3	TWA	1.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Methemoglobinemia Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Methemoglobinemia Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	1.000000 ppm 5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation The value in mg/m3 is approximate.		
		TWA	1.000000 ppm 5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		PEL	1 ppm 5 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Nitrobenzene	98-95-3	Total p-nitrophenol	5mg/g Creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		Methemoglobin	1.5% Hb	In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		Methemoglobin	1.5% Hb	In blood	ACGIH - Biological Exposure Indices (BEI)
		During or at the end of the shift			

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: 40 min
Material tested:Lapren® (KCL 706 / Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless, yellow
b)	Odour	pungent
c)	Odour Threshold	No data available
d)	pH	8.0 - 8.5 at 1.00000 g/l at 20.0 °C (68.0 °F)
e)	Melting point/freezing point	Melting point/range: 5 - 6 °C (41 - 43 °F) - lit.
f)	Initial boiling point and boiling range	210 - 211 °C (410 - 412 °F) - lit.
g)	Flash point	88.0 °C (190.4 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 40 %(V) Lower explosion limit: 1.8 %(V)
k)	Vapour pressure	66.7 hPa (50.0 mmHg) at 120.0 °C (248.0 °F) 0.3 hPa (0.2 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available

m)	Relative density	1.196 g/cm3 at 25 °C (77 °F)
n)	Water solubility	1.9 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 1.86 at 24.5 °C (76.1 °F)
p)	Auto-ignition temperature	482.0 °C (899.6 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	43.4 mN/m at 20.0 °C (68.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents, Strong reducing agents, Strong bases

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 588 mg/kg

LC50 Inhalation - Rat - 4 h - 556 ppm
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Lacrimation. Behavioral:Tremor. Cyanosis

LD50 Dermal - Rabbit - 760 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: No skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation

Respiratory or skin sensitisation
- Mouse

Result: Did not cause sensitisation on laboratory animals.
(OECD Test Guideline 429)

Germ cell mutagenicity
unscheduled DNA synthesis assay
rat hepatocytes
Result: negative

OECD Test Guideline 474
Mouse - male and female
Result: negative

Carcinogenicity

Suspected human carcinogens

IARC: 2B - Group 2B: Possibly carcinogenic to humans (Nitrobenzene)

NTP: Reasonably anticipated to be a human carcinogen (Nitrobenzene)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity

Presumed human reproductive toxicant

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Inhalation - Causes damage to organs through prolonged or repeated exposure. - Blood
Inhalation - Blood

Aspiration hazard
No data available

Additional Information

Repeated dose toxicity	Rat - male and female - Oral - 28 d - LOAEL : 5 mg/kg
	Rat - male and female - Inhalation - 14 d - NOAEL : 0.625 mg/l - LOAEL : < 0.05 mg/l - OECD Test Guideline 412

RTECS: DA6475000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated., Absorption into the body leads to the formation of methemoglobin which in sufficient concentration causes cyanosis. Onset may be delayed 2 to 4 hours or longer., Exposure to and/or consumption of alcohol may increase toxic effects.

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Danio rerio (zebra fish) - 92 mg/l - 96.0 h (OECD Test Guideline 203)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Daphnia magna (Water flea) - 35 mg/l - 48 h
Toxicity to algae	Growth inhibition EC50 - Chlorella pyrenoidosa - 18 mg/l - 96 h (OECD Test Guideline 201)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 14 d Result: 3.3 % - Not readily biodegradable.

(OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation Cyprinus carpio (Carp) - 42 d
at 25 °C - 0.125 mg/l

Bioconcentration factor (BCF): 3.1 - 4.8
(OECD Test Guideline 305C)

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1662 Class: 6.1 Packing group: II
Proper shipping name: Nitrobenzene
Reportable Quantity (RQ): 100 lbs
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG

UN number: 1662 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: NITROBENZENE
Marine pollutant:yes

IATA

UN number: 1662 Class: 6.1 Packing group: II
Proper shipping name: Nitrobenzene

15. REGULATORY INFORMATION

SARA 302 Components

The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Nitrobenzene	98-95-3	2007-07-01

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Nitrobenzene	98-95-3	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date

Nitrobenzene	98-95-3	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Nitrobenzene	98-95-3	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Nitrobenzene	98-95-3	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Nitrobenzene	CAS-No. 98-95-3	Revision Date 2010-06-11
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm. Nitrobenzene	CAS-No. 98-95-3	Revision Date 2010-06-11

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H301	Toxic if swallowed.
H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled
H311	Toxic in contact with skin.
H331	Toxic if inhaled.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

SAFETY DATA SHEET

Version 5.6
Revision Date 05/24/2016
Print Date 11/14/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *N*-Nitrosodimethylamine

Product Number : N7756
Brand : Sigma
Index-No. : 612-077-00-3

CAS-No. : 62-75-9

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 4), H227
Acute toxicity, Oral (Category 2), H300
Acute toxicity, Inhalation (Category 1), H330
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - repeated exposure (Category 1), H372
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H227	Combustible liquid.
H300 + H330	Fatal if swallowed or if inhaled
H350	May cause cancer.
H372	Causes damage to organs through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/doctor. Rinse mouth.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Dimethylnitrosamine
Formula	:	$C_2H_6N_2O$
Molecular weight	:	74.08 g/mol
CAS-No.	:	62-75-9
EC-No.	:	200-549-8
Index-No.	:	612-077-00-3

Hazardous components

Component	Classification	Concentration
N-Nitrosodimethylamine		
	Flam. Liq. 4; Acute Tox. 2; Acute Tox. 1; Carc. 1B; STOT RE 1; Aquatic Acute 2; Aquatic Chronic 2; H227, H300 + H330, H350, H372, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

	Remarks	Potential Occupational Carcinogen See Appendix A
		Liver damage Liver cancer Kidney cancer Exposure by all routes should be carefully controlled to levels as low as possible. Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption
		See 1910.1016

Hazardous components without workplace control parameters

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	153 °C (307 °F) at 1,032 hPa (774 mmHg) - lit.
g)	Flash point	61.0 °C (141.8 °F) - closed cup

h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.01 g/cm3
n)	Water solubility	soluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Hazardous decomposition products formed under fire conditions. - Nature of decomposition products not known.
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 37.0 mg/kg

LC50 Inhalation - Rat - 4 h - 78 ppm

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	2A - Group 2A: Probably carcinogenic to humans (N-Nitrosodimethylamine)
NTP:	Reasonably anticipated to be a human carcinogen (N-Nitrosodimethylamine)
OSHA:	OSHA specifically regulated carcinogen (N-Nitrosodimethylamine)

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: IQ0525000

Bladder -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 832.00 - 1,062.00 mg/l - 96 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 4.00 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3382 Class: 6.1 Packing group: I
Proper shipping name: Toxic by inhalation liquid, n.o.s. (N-Nitrosodimethylamine)
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: Hazard zone B

IMDG
UN number: 3382 Class: 6.1 Packing group: I EMS-No: F-A, S-A
Proper shipping name: TOXIC BY INHALATION LIQUID, N.O.S. (N-Nitrosodimethylamine)
Marine pollutant:yes

IATA
UN number: 3382 Class: 6.1
Proper shipping name: Toxic by inhalation liquid, n.o.s. (N-Nitrosodimethylamine)
IATA Passenger: Not permitted for transport
IATA Cargo: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

New Jersey Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2008-11-03

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
N-Nitrosodimethylamine	62-75-9	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Flam. Liq.	Flammable liquids
H227	Combustible liquid.
H300	Fatal if swallowed.
H300 + H330	Fatal if swallowed or if inhaled
H330	Fatal if inhaled.
H350	May cause cancer.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	2
Physical Hazard	0

NFPA Rating

Health hazard:	4
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 05/24/2016 Print Date: 11/14/2016

SAFETY DATA SHEET

Version 4.6
Revision Date 05/23/2016
Print Date 11/14/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *N*-Nitrosodi-*n*-propylamine

Product Number : 48554
Brand : Supelco
Index-No. : 612-098-00-8

CAS-No. : 621-64-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Carcinogenicity (Category 1B), H350
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H302 Harmful if swallowed.
H350 May cause cancer.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell. Rinse mouth.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C6H14N2O
Molecular weight	:	130.22 g/mol
CAS-No.	:	621-64-7
EC-No.	:	210-698-0
Index-No.	:	612-098-00-8

Hazardous components

Component	Classification	Concentration
N-Nitroso dipropylamine		
	Acute Tox. 4; Carc. 1B; Aquatic Acute 2; Aquatic Chronic 2; H302, H350, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls.

If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	No data available
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.92 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 1.36
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
copper salts, mercury salts, Strong mineral acids, Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Nitrogen oxides (NOx)
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 480.0 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Possible human carcinogen

IARC:	2B - Group 2B: Possibly carcinogenic to humans (N-Nitroso dipropylamine)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.
NTP:	Reasonably anticipated to be a human carcinogen (N-Nitroso dipropylamine)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: JL9700000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Lungs -

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (N-Nitroso dipropylamine)
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3082 Class: 9 Packing group: III EMS-No: F-A, S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (N-Nitroso dipropylamine)

IATA
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (N-Nitroso dipropylamine)

Further information
EHS-Mark required (ADR 2.2.9.1.10, IMDG code 2.10.3) for single packagings and combination packagings containing inner packagings with Dangerous Goods > 5L for liquids or > 5kg for solids.

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
N-Nitroso dipropylamine	621-64-7	2007-07-01

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. N-Nitroso dipropylamine	CAS-No. 621-64-7	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
H302	Harmful if swallowed.
H350	May cause cancer.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 05/23/2016 Print Date: 11/14/2016

SAFETY DATA SHEET

Version 5.3
Revision Date 08/24/2015
Print Date 12/12/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : N-Nitrosodiphenylamine

Product Number : 48553
Brand : Supelco

CAS-No. : 86-30-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 4), H302
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P273 Avoid release to the environment.
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER or doctor/ physician if you feel unwell. Rinse mouth.
P391 Collect spillage.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Diphenylnitrosamine Diphenylnitrosoamine N-Nitroso-N-phenylaniline
Formula	:	$C_{12}H_{10}N_2O$
Molecular weight	:	198.22 g/mol
CAS-No.	:	86-30-6
EC-No.	:	201-663-0

Hazardous components

Component	Classification	Concentration
N-Nitrosodiphenylamine		
	Acute Tox. 4; Aquatic Acute 2; Aquatic Chronic 2; H302, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Nitrogen oxides (NOx)

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions

Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up

Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm

Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 65 - 66 °C (149 - 151 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.13
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Solubility in other solvents	Methanol 100 g/l - soluble

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,825 mg/kg
Remarks: Cyanosis

Inhalation: No data available

LD50 Dermal - Rabbit - > 7,940 mg/kg
Remarks: Behavioral:Food intake (animal). Behavioral:Change in motor activity (specific assay).

No data available

Skin corrosion/irritation
Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.

Carcinogenicity

Carcinogenicity - Rat - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors.

Carcinogenicity - Mouse - Skin
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Lungs, Thorax, or Respiration:Bronchiogenic carcinoma.
Tumorigenic:Increased incidence of tumors in susceptible strains.

Carcinogenicity - Rat - Oral
Tumorigenic:Carcinogenic by RTECS criteria. Kidney, Ureter, Bladder:Tumors. Skin and Appendages: Other: Tumors.

Carcinogenicity - Rat - Intraperitoneal
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Liver:Tumors. Endocrine:Tumors.

Carcinogenicity - Mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Kidney, Ureter, Bladder:Tumors.

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification. Nitrosamines are suspected of causing cancers of the lung, nasal sinuses, brain, esophagus, stomach, liver, bladder, and kidney.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (N-Nitrosodiphenylamine)

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: JJ9800000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Bladder -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 5.8 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 7.8 mg/l - 48 h

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 14 d - 0.00921 mg/l Bioconcentration factor (BCF): 217

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (N-Nitrosodiphenylamine)
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
N-Nitrosodiphenylamine	86-30-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. N-Nitrosodiphenylamine	CAS-No. 86-30-6	Revision Date 2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity

H302	Harmful if swallowed.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.3 Revision Date: 08/24/2015 Print Date: 12/12/2016

Safety Data Sheet
acc. to OSHA HCS

Printing date 03/28/2019 Version Number 3 Reviewed on 03/23/2019

*

1 Identification

· **Product identifier**

· **Trade name: n-Propylbenzene Standard (1X1 mL)**

· **Part number:** EPA-1045-1
· **Application of the substance / the mixture** Reagents and Standards for Analytical Chemical Laboratory Use

· **Details of the supplier of the safety data sheet**
· **Manufacturer/Supplier:**
Agilent Technologies, Inc.
5301 Stevens Creek Blvd.
Santa Clara, CA 95051 USA

· **Information department:**
Telephone: 800-227-9770
e-mail: pdl-msds_author@agilent.com
· **Emergency telephone number:** CHEMTREC®: 1-800-424-9300

2 Hazard(s) identification

· **Classification of the substance or mixture**


GHS02 Flame

Flam. Liq. 2 H225 Highly flammable liquid and vapor.


GHS06 Skull and crossbones

Acute Tox. 3 H331 Toxic if inhaled.


GHS08 Health hazard

Carc. 2 H351 Suspected of causing cancer.
STOT SE 1 H370 Causes damage to organs.

· **Label elements**
· **GHS label elements** The product is classified and labeled according to the Globally Harmonized System (GHS).
· **Hazard pictograms**


GHS02 GHS06 GHS08

· **Signal word** Danger

· **Hazard-determining components of labeling:**
methanol
· **Hazard statements**
Highly flammable liquid and vapor.
Toxic if inhaled.
Suspected of causing cancer.

(Contd. on page 2)

Safety Data Sheet
acc. to OSHA HCS

Trade name: n-Propylbenzene Standard (1X1 mL)

(Contd. of page 1)

Causes damage to organs.

· **Precautionary statements**
Obtain special instructions before use.
Do not handle until all safety precautions have been read and understood.
Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
Ground/bond container and receiving equipment.
Use explosion-proof electrical/ventilating/lighting/equipment.
Use only non-sparking tools.
Take precautionary measures against static discharge.
Do not breathe dust/fume/gas/mist/vapors/spray.
Wash thoroughly after handling.
Do not eat, drink or smoke when using this product.
Use only outdoors or in a well-ventilated area.
Wear protective gloves/protective clothing/eye protection/face protection.
If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
IF INHALED: Remove person to fresh air and keep comfortable for breathing.
IF exposed or concerned: Get medical advice/attention.
Specific treatment (see on this label).
In case of fire: Use for extinction: CO2, powder or water spray.
Store in a well-ventilated place. Keep container tightly closed.
Store in a well-ventilated place. Keep cool.
Store locked up.
Dispose of contents/container in accordance with local/regional/national/international regulations.

· **Classification system:**
· **NFPA ratings (scale 0 - 4)**



Health = 1
Fire = 3
Reactivity = 0

· **HMIS-ratings (scale 0 - 4)**



Health = *1
Fire = 3
Reactivity = 0

· **Other hazards**
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.

3 Composition/information on ingredients

· **Chemical characterization: Mixtures**
· **Description:** Mixture of the substances listed below with nonhazardous additions.

· **Dangerous components:**		
67-56-1	methanol	99.368%
103-65-1	propylbenzene	0.632%

(Contd. on page 3)

Safety Data Sheet
acc. to OSHA HCS

(Contd. of page 2)

4 First-aid measures

· **Description of first aid measures**
· **General information:**
Immediately remove any clothing soiled by the product.
Remove breathing apparatus only after contaminated clothing have been completely removed.
In case of irregular breathing or respiratory arrest provide artificial respiration.
· **After inhalation:**
Supply fresh air or oxygen; call for doctor.
In case of unconsciousness place patient stably in side position for transportation.
· **After skin contact:** Immediately wash with water and soap and rinse thoroughly.
· **After eye contact:** Rinse opened eye for several minutes under running water. Then consult a doctor.
· **After swallowing:** If symptoms persist consult doctor.
· **Information for doctor:**
· **Most important symptoms and effects, both acute and delayed** No further relevant information available.
· **Indication of any immediate medical attention and special treatment needed**
No further relevant information available.

5 Fire-fighting measures

· **Extinguishing media**
· **Suitable extinguishing agents:**
CO2, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.
· **For safety reasons unsuitable extinguishing agents:** Water with full jet
· **Special hazards arising from the substance or mixture**
During heating or in case of fire poisonous gases are produced.
· **Advice for firefighters**
· **Protective equipment:** Mouth respiratory protective device.

6 Accidental release measures

· **Personal precautions, protective equipment and emergency procedures**
Mount respiratory protective device.
Wear protective equipment. Keep unprotected persons away.
· **Environmental precautions:** Do not allow to enter sewers/ surface or ground water.
· **Methods and material for containment and cleaning up:**
Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
Dispose contaminated material as waste according to item 13.
Ensure adequate ventilation.
· **Reference to other sections**
See Section 7 for information on safe handling.
See Section 8 for information on personal protection equipment.
See Section 13 for disposal information.
· **Protective Action Criteria for Chemicals**

· **PAC-1:**		
67-56-1	methanol	530 ppm
103-65-1	propylbenzene	3.7 ppm

(Contd. on page 4)

(Contd. of page 3)

· **PAC-2:**		
67-56-1	methanol	2,100 ppm
103-65-1	propylbenzene	41 ppm

· **PAC-3:**		
67-56-1	methanol	7200* ppm
103-65-1	propylbenzene	240 ppm

7 Handling and storage

· **Handling:**
· **Precautions for safe handling**
Ensure good ventilation/exhaustion at the workplace.
Open and handle receptacle with care.
Prevent formation of aerosols.
· **Information about protection against explosions and fires:**
Keep ignition sources away - Do not smoke.
Protect against electrostatic charges.
Keep respiratory protective device available.

· **Conditions for safe storage, including any incompatibilities**
· **Storage:**
· **Requirements to be met by storerooms and receptacles:** Store in a cool location.
· **Information about storage in one common storage facility:** Not required.
· **Further information about storage conditions:**
Keep receptacle tightly sealed.
Store in cool, dry conditions in well sealed receptacles.
· **Specific end use(s)** No further relevant information available.

8 Exposure controls/personal protection

· **Additional information about design of technical systems:** No further data; see item 7.

· **Control parameters**

· **Components with limit values that require monitoring at the workplace:**	
67-56-1 methanol	
PEL	Long-term value: 260 mg/m³, 200 ppm
REL	Short-term value: 325 mg/m³, 250 ppm Long-term value: 260 mg/m³, 200 ppm Skin
TLV	Short-term value: 328 mg/m³, 250 ppm Long-term value: 262 mg/m³, 200 ppm Skin; BEI

· **Ingredients with biological limit values:**	
67-56-1 methanol	
BEI	15 mg/L Medium: urine Time: end of shift Parameter: Methanol (background, nonspecific)

(Contd. on page 5)

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(Contd. of page 4)

· **Additional information:** The lists that were valid during the creation were used as basis.

· **Exposure controls**
· **Personal protective equipment:**
· **General protective and hygienic measures:**
Keep away from foodstuffs, beverages and feed.
Immediately remove all soiled and contaminated clothing.
Wash hands before breaks and at the end of work.
Store protective clothing separately.
· **Breathing equipment:**
When used as intended with Agilent instruments, the use of the product under normal laboratory conditions and with standard practices does not result in significant airborne exposures and therefore respiratory protection is not needed.
Under an emergency condition where a respirator is deemed necessary, use a NIOSH or equivalent approved device/equipment with appropriate organic or acid gas cartridge.
· **Protection of hands:**
Although not recommended for constant contact with the chemicals or for clean-up, nitrile gloves 11-13 mil thickness are recommended for normal use. The breakthrough time is 1 hr. For cleaning a spill where there is direct contact of the chemical, butyl rubber gloves are recommended 12-15 mil thickness with breakthrough times exceeding 4 hrs. Supplier recommendations should be followed.
· **Material of gloves**
For normal use: nitrile rubber, 11-13 mil thickness
For direct contact with the chemical: butyl rubber, 12-15 mil thickness
· **Penetration time of glove material**
For normal use: nitrile rubber: 1 hour
For direct contact with the chemical: butyl rubber: >4 hours
· **Eye protection:**



Tightly sealed goggles

9 Physical and chemical properties

· **Information on basic physical and chemical properties**	
· **General Information**	
· **Appearance:**	
Form:	Fluid
Color:	Colorless
· **Odor:**	Alcohol-like
· **Odor threshold:**	Not determined.
· **pH-value:**	Not determined.
· **Change in condition**	
Melting point/Melting range:	-98 °C (-144.4 °F)
Boiling point/Boiling range:	64.7 °C (148.5 °F)
· **Flash point:**	9 °C (48.2 °F)
· **Flammability (solid, gaseous):**	Not applicable.

(Contd. on page 6)

(Contd. of page 5)

· **Ignition temperature:**	455 °C (851 °F)
· **Decomposition temperature:**	Not determined.
· **Auto igniting:**	Product is not selfigniting.
· **Danger of explosion:**	Product is not explosive. However, formation of explosive air/vapor mixtures are possible.
· **Explosion limits:**	
Lower:	5.5 Vol %
Upper:	44 Vol %
· **Vapor pressure at 20 °C (68 °F):**	100 hPa (75 mm Hg)
· **Density at 20 °C (68 °F):**	0.80063 g/cm³ (6.68126 lbs/gal)
· **Relative density**	Not determined.
· **Vapor density**	Not determined.
· **Evaporation rate**	Not determined.
· **Solubility in / Miscibility with**	
Water:	Not miscible or difficult to mix.
· **Partition coefficient (n-octanol/water):**	Not determined.
· **Viscosity:**	
Dynamic:	Not determined.
Kinematic:	Not determined.
· **Solvent content:**	
Organic solvents:	100.0 %
VOC content:	100.00 % 800.6 g/l / 6.68 lb/gal
Solids content:	0.0 %
· **Other information**	No further relevant information available.

10 Stability and reactivity

· **Reactivity** No further relevant information available.
· **Chemical stability**
· **Thermal decomposition / conditions to be avoided:** No decomposition if used according to specifications.
· **Possibility of hazardous reactions** No dangerous reactions known.
· **Conditions to avoid** No further relevant information available.
· **Incompatible materials:** No further relevant information available.
· **Hazardous decomposition products:** No dangerous decomposition products known.

11 Toxicological information

· **Information on toxicological effects**
· **Acute toxicity:**

· **LD/LC50 values that are relevant for classification:**		
ATE (Acute Toxicity Estimate)		
Inhalative	LC50/4 h	3.02 mg/L

(Contd. on page 7)

(Contd. of page 6)

67-56-1 methanol		
Oral	LD50	5,628 mg/kg (rat)
Dermal	LD50	15,800 mg/kg (rabbit)
103-65-1 propylbenzene		
Oral	LD50	6,040 mg/kg (rat)

· **Primary irritant effect:**
· **on the skin:** No irritant effect.
· **on the eye:** No irritating effect.
· **Sensitization:** No sensitizing effects known.
· **Additional toxicological information:**
The product shows the following dangers according to internally approved calculation methods for preparations:
Toxic

· **Carcinogenic categories**

· **IARC (International Agency for Research on Cancer)**
None of the ingredients is listed.

· **NTP (National Toxicology Program)**
None of the ingredients is listed.

· **OSHA-Ca (Occupational Safety & Health Administration)**
None of the ingredients is listed.

12 Ecological information

· **Toxicity**
· **Aquatic toxicity:** No further relevant information available.
· **Persistence and degradability** No further relevant information available.
· **Behavior in environmental systems:**
· **Bioaccumulative potential** No further relevant information available.
· **Mobility in soil** No further relevant information available.
· **Additional ecological information:**
· **General notes:**
Water hazard class 1 (Self-assessment): slightly hazardous for water
Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
· **Results of PBT and vPvB assessment**
· **PBT:** Not applicable.
· **vPvB:** Not applicable.
· **Other adverse effects** No further relevant information available.

13 Disposal considerations

· **Waste treatment methods**
· **Recommendation:**
Must not be disposed of together with household garbage. Do not allow product to reach sewage system.

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Trade name: n-Propylbenzene Standard (1X1 mL)

(Contd. of page 7)

· **Uncleaned packagings:**
· **Recommendation:** Disposal must be made according to official regulations.

*
14 Transport information

· **Not Regulated, De minimus Quantities**	-
· **UN-Number**	
· **DOT, IMDG, IATA**	UN1230
· **UN proper shipping name**	
· **DOT**	Methanol solution
· **IMDG, IATA**	METHANOL solution
· **Transport hazard class(es)**	
· **DOT**	
· **Class**	3 Flammable liquids
· **Label**	3, 6.1
· **IMDG**	
· **Class**	3 Flammable liquids
· **Label**	3/6.1
· **IATA**	
· **Class**	3 Flammable liquids
· **Label**	3 (6.1)
· **Packing group**	
· **DOT, IMDG, IATA**	II
· **Environmental hazards:**	Not applicable.
· **Special precautions for user**	Warning: Flammable liquids
· **Danger code (Kemler):**	336
· **EMS Number:**	F-E,S-D
· **Stowage Category**	B
· **Stowage Code**	SW2 Clear of living quarters.
· **Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code**	Not applicable.

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(Contd. of page 8)

· **Transport/Additional information:**

· **DOT**

· **Quantity limitations**	On passenger aircraft/rail: 1 L On cargo aircraft only: 60 L

· **IMDG**

· **Limited quantities (LQ)**	1L
· **Excepted quantities (EQ)**	Code: E2 Maximum net quantity per inner packaging: 30 ml Maximum net quantity per outer packaging: 500 ml
· **UN "Model Regulation":**	UN 1230 METHANOL SOLUTION, 3 (6.1), II

15 Regulatory information

· **Safety, health and environmental regulations/legislation specific for the substance or mixture**

· **Sara**

· **Section 355 (extremely hazardous substances):**

None of the ingredients is listed.

· **Section 313 (Specific toxic chemical listings):**

67-56-1	methanol

· **TSCA (Toxic Substances Control Act):**

All ingredients are listed.

· **Proposition 65**

· **Chemicals known to cause cancer:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for females:**

None of the ingredients is listed.

· **Chemicals known to cause reproductive toxicity for males:**

None of the ingredients is listed.

· **Chemicals known to cause developmental toxicity:**

67-56-1	methanol

· **Carcinogenic categories**

· **EPA (Environmental Protection Agency)**

None of the ingredients is listed.

· **TLV (Threshold Limit Value established by ACGIH)**

None of the ingredients is listed.

· **NIOSH-Ca (National Institute for Occupational Safety and Health)**

None of the ingredients is listed.

· **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

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acc. to OSHA HCS

(Contd. of page 9)

16 Other information

The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

· **Department issuing SDS:** Document Control / Regulatory
· **Contact:** regulatory@ultrasci.com
· **Date of preparation / last revision** 03/28/2019 / 2
· **Abbreviations and acronyms:**
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
IMDG: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IATA: International Air Transport Association
ACGIH: American Conference of Governmental Industrial Hygienists
EINECS: European Inventory of Existing Commercial Chemical Substances
ELINCS: European List of Notified Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
NFPA: National Fire Protection Association (USA)
HMIS: Hazardous Materials Identification System (USA)
VOC: Volatile Organic Compounds (USA, EU)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
PBT: Persistent, Bioaccumulative and Toxic
vPvB: very Persistent and very Bioaccumulative
NIOSH: National Institute for Occupational Safety
OSHA: Occupational Safety & Health
TLV: Threshold Limit Value
PEL: Permissible Exposure Limit
REL: Recommended Exposure Limit
BEI: Biological Exposure Limit
Flam. Liq. 2: Flammable liquids – Category 2
Acute Tox. 3: Acute toxicity – Category 3
Carc. 2: Carcinogenicity – Category 2
STOT SE 1: Specific target organ toxicity (single exposure) – Category 1
· *** Data compared to the previous version altered.**

SAFETY DATA SHEET

Version 4.7
Revision Date 05/27/2015
Print Date 04/01/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *o*-Cresol

Product Number : C85700
Brand : Sigma-Aldrich
Index-No. : 604-004-00-9

CAS-No. : 95-48-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 + H311 Toxic if swallowed or in contact with skin
H314 Causes severe skin burns and eye damage.
H318 Causes serious eye damage.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P260 Do not breathe dust or mist.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	2-Methylphenol
Formula	:	C_7H_8O
Molecular weight	:	108.14 g/mol
CAS-No.	:	95-48-7
EC-No.	:	202-423-8
Index-No.	:	604-004-00-9

Hazardous components

Component	Classification	Concentration
o-Cresol		
	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 2; Aquatic Chronic 2; H301 + H311, H314, H318, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Air and light sensitive. Keep in a dry place.
Storage class (TRGS 510): Non-combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
o-Cresol	95-48-7	TWA	5.000000 ppm 22.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin contact does contribute to exposure.		

		TWA	5.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye, skin, & Upper Respiratory Tract irritation Adopted values or notations enclosed are those for which changes are proposed in the NIC 2010 Revision or addition to the notice of intended changes See Notice of Intended Changes (NIC) Danger of cutaneous absorption		
		TWA	2.300000 ppm 10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	20.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: white
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	4.5 at 25.00000 g/l
e)	Melting point/freezing point	Melting point/range: 29 - 31 °C (84 - 88 °F) - lit.
f)	Initial boiling point and boiling range	191 °C (376 °F) - lit.
g)	Flash point	81.0 °C (177.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 58 %(V) Lower explosion limit: 1.3 %(V)
k)	Vapour pressure	3.1 hPa (2.3 mmHg) at 60.0 °C (140.0 °F) 1.3 hPa (1.0 mmHg) at 38.2 °C (100.8 °F) 0.4 hPa (0.3 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.05 g/cm3 at 20.00 °C (68.00 °F)
n)	Water solubility	25 g/l at 20 °C (68 °F)
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	599.0 °C (1,110.2 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity

No data available

10.2 Chemical stability

Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions

No data available

10.4 Conditions to avoid

No data available

10.5 Incompatible materials

Oxidizing agents

10.6 Hazardous decomposition products

Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 121.0 mg/kg
Remarks: Behavioral:Convulsions or effect on seizure threshold. Lungs, Thorax, or Respiration:Dyspnea. Gastrointestinal:Ulceration or bleeding from stomach.

LC50 Inhalation - Rat - 1 h - > 1,220 mg/m3
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Eye:Lacrimation. Behavioral:Somnolence (general depressed activity).

LD50 Dermal - Rabbit - 890.0 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Severe skin irritation - 24 h
(Draize Test)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Severe eye irritation
(Draize Test)

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GO6300000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Central nervous system depression, Diarrhoea, Gastrointestinal disturbance

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Leuciscus idus (Golden orfe) - 10.00 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	Immobilization EC50 - Daphnia magna (Water flea) - 15.8 mg/l - 48 h
Toxicity to algae	EC50 - SELENASTRUM - 100.00 mg/l - 72 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life with long lasting effects.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3455 Class: 6.1 (8) Packing group: II EMS-No: F-A, S-B
Proper shipping name: CRESOLS, SOLID

IATA
UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
o-Cresol	95-48-7	2007-07-01

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
o-Cresol	95-48-7	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
o-Cresol	95-48-7	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
o-Cresol	95-48-7	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
o-Cresol	95-48-7	2007-07-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	2
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.7 Revision Date: 05/27/2015 Print Date: 04/01/2016

SAFETY DATA SHEET

Version 5.5
Revision Date 06/02/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *o*-Xylene

Product Number : 95660
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 95-47-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Aspiration hazard (Category 1), H304
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H312 + H332	Harmful in contact with skin or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.

H335	May cause respiratory irritation.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P210	Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P331	Do NOT induce vomiting.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P403 + P235	Store in a well-ventilated place. Keep cool.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	1,2-Dimethylbenzene
Formula	:	C_8H_{10}
Molecular weight	:	106.17 g/mol
CAS-No.	:	95-47-6
EC-No.	:	202-422-2
Index-No.	:	601-022-00-9

Hazardous components

Component	Classification	Concentration
o-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Eye Irrit. 2A; STOT SE 3; Asp. Tox. 1; Aquatic Acute 3; Aquatic Chronic 3; H226, H304, H312 + H332, H315, H319, H335, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
o-Xylene	95-47-6	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment		

		Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
o-Xylene	95-47-6	Methylhippuric acids	1,500.0000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber

Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -26 - -23 °C (-15 - -9 °F) - lit.
f)	Initial boiling point and boiling range	143 - 145 °C (289 - 293 °F) - lit.
g)	Flash point	31.0 °C (87.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 6.7 %(V) Lower explosion limit: 0.9 %(V)
k)	Vapour pressure	21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F)
l)	Vapour density	No data available
m)	Relative density	0.879 g/mL at 20 °C (68 °F)
n)	Water solubility	0.1705 g/l at 25 °C (77 °F) - partly soluble
o)	Partition coefficient: n-octanol/water	log Pow: 3.12 at 20 °C (68 °F)
p)	Auto-ignition temperature	464.0 °C (867.2 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available

s) Explosive properties No data available

t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 29.8 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - male - 6 h - 18,800 mg/m3

Dermal: No data available

LD50 Intraperitoneal - Mouse - 1,364 mg/kg

Skin corrosion/irritation
Skin - Rabbit
Result: Irritating to skin. - 24 h

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
- Mouse
Result: Does not cause skin sensitisation.
(OECD Test Guideline 429)

Germ cell mutagenicity
Ames test
Salmonella typhimurium
Result: negative

Carcinogenicity

This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: 3 - Group 3: Not classifiable as to its carcinogenicity to humans (o-Xylene)

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
May be fatal if swallowed and enters airways.

Additional Information
RTECS: ZE2450000

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Dermatitis, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Nerves. -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Lepomis macrochirus (Bluegill) - 16.10 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 69.67 % - Not readily biodegradable. (OECD Test Guideline 301F) Remarks: The 10 day time window criterion is not fulfilled.

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA
UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
o-Xylene	95-47-6	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Asp. Tox.	Aspiration hazard
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.

H312 + H332	Harmful in contact with skin or if inhaled
H315	Causes skin irritation.
H319	Causes serious eye irritation.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.5 Revision Date: 06/02/2016 Print Date: 06/21/2016

SAFETY DATA SHEET

Version 4.10
Revision Date 11/12/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *p*-Cresol

Product Number : W233706
Brand : Aldrich
Index-No. : 604-004-00-9

CAS-No. : 106-44-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Dermal (Category 3), H311
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 + H311 Toxic if swallowed or in contact with skin
H314 Causes severe skin burns and eye damage.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P260 Do not breathe dust or mist.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.

P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310	Immediately call a POISON CENTER or doctor/ physician.
P322	Specific measures (see supplemental first aid instructions on this label).
P361	Remove/Take off immediately all contaminated clothing.
P363	Wash contaminated clothing before reuse.
P391	Collect spillage.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 4-Methylphenol

Formula : C_7H_8O

Molecular weight : 108.14 g/mol

CAS-No. : 106-44-5

EC-No. : 203-398-6

Index-No. : 604-004-00-9

Hazardous components

Component	Classification	Concentration
p-Cresol		
	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Aquatic Acute 2; Aquatic Chronic 2; H301 + H311, H314, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

hygroscopic Air and light sensitive. Handle and store under inert gas.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
p-Cresol	106-44-5	TWA	2.3 ppm 10 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5 ppm 22 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
	Remarks	Skin designation The value in mg/m3 is approximate.		

		TWA	20 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen Danger of cutaneous absorption		

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing	Melting point/range: 31 - 37 °C (88 - 99 °F)

	point	Melting point/range: 32 - 34 °C (90 - 93 °F) - lit.
f)	Initial boiling point and boiling range	202 °C (396 °F) - lit.
g)	Flash point	85.0 °C (185.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	1.3 hPa (1.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.034 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 1.94
p)	Auto-ignition temperature	559.0 °C (1,038.2 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Bases

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 207.0 mg/kg
Remarks: Sense Organs and Special Senses (Nose, Eye, Ear, and Taste):Olfaction:Other changes. Behavioral:Convulsions or effect on seizure threshold. Gastrointestinal:Ulceration or bleeding from stomach.

LC50 Inhalation - Rat - 1 h - > 710 mg/m3

LD50 Dermal - Rabbit - 301.0 mg/kg
Remarks: Behavioral:Tremor. Gastrointestinal:Changes in structure or function of salivary glands. Kidney, Ureter, Bladder:Other changes.

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Severe eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: GO6475000

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, laryngitis, Dizziness, Cardiovascular effects., Muscle cramps/spasms., Symptoms of exposure may include burning sensation, coughing, wheezing, laryngitis, shortness of breath, headache, nausea, and vomiting.

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - other fish - 16.00 - 24.00 mg/l - 24 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 7.9 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 1.4 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 3455 Class: 6.1 (8) Packing group: II EMS-No: F-A, S-B
Proper shipping name: CRESOLS, SOLID

IATA
UN number: 3455 Class: 6.1 (8) Packing group: II
Proper shipping name: Cresols, solid

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
p-Cresol	106-44-5	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Dam.	Serious eye damage
H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin
H311	Toxic in contact with skin.
H314	Causes severe skin burns and eye damage.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	3
Fire Hazard:	2
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.10 Revision Date: 11/12/2015 Print Date: 02/07/2016

SAFETY DATA SHEET

Version 4.9
Revision Date 12/29/2015
Print Date 02/22/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Pentachlorophenol

Product Number : P2604
Brand : Aldrich
Index-No. : 604-002-00-8

CAS-No. : 87-86-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 2), H330
Acute toxicity, Dermal (Category 3), H311
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H301 + H311 Toxic if swallowed or in contact with skin
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H330 Fatal if inhaled.
H335 May cause respiratory irritation.

H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P284	Wear respiratory protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER or doctor/ physician. Rinse mouth.
P302 + P352 + P312	IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	C_6HCl_5O
Molecular weight	:	266.34 g/mol
CAS-No.	:	87-86-5
EC-No.	:	201-778-6
Index-No.	:	604-002-00-8

Hazardous components

Component	Classification	Concentration
Pentachlorophenol		
	Acute Tox. 3; Acute Tox. 2; Acute Tox. 3; Skin Irrit. 2; Eye Irrit. 2A; Carc. 2; STOT SE 3; Aquatic Acute 1; Aquatic Chronic 2; H301 + H311, H315, H319, H330, H335, H351, H400, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Wear respiratory protection. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Pentachlorophenol	87-86-5	TWA	0.500000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Cardiac impairment Adopted values or notations enclosed are those for which changes are proposed in the NIC See Notice of Intended Changes (NIC) Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		TWA	0.500000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	0.500000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		TWA	0.5 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Cardiac impairment 2015 Adoption Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		
		STEL	1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Cardiac impairment 2015 Adoption Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Confirmed animal carcinogen with unknown relevance to humans Danger of cutaneous absorption		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Pentachlorophenol	87-86-5	pentachlorophenol	2.0000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to last shift of workweek			
		Free PCP	5.0000 mg/l	In plasma	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			
		pentachlorophenol		Urine	ACGIH - Biological Exposure Indices (BEI)

		Prior to last shift of workweek

8.2 Exposure controls

Appropriate engineering controls
Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 120 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: crystalline Colour: light red
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 165 - 180 °C (329 - 356 °F)
f)	Initial boiling point and boiling range	310 °C (590 °F)
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	No data available

	flammability or explosive limits	
k)	Vapour pressure	53.3 hPa (40.0 mmHg) at 211.2 °C (412.2 °F)
l)	Vapour density	No data available
m)	Relative density	1.978 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5.12
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Strong bases

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 27 mg/kg
Remarks: Vascular:BP elevation not charactertized in autonomic section. Endocrine:Hyperglycemia. Nutritional and Gross Metabolic:Changes in:Body temperature increase.

LC50 Inhalation - Rat - 355 mg/m3
Remarks: Behavioral:Excitement. Behavioral:Muscle contraction or spasticity. Lungs, Thorax, or Respiration:Dyspnea.

LD50 Dermal - Rat - 96.0 mg/kg
Remarks: Behavioral:Excitement. Behavioral:Muscle contraction or spasticity. Lungs, Thorax, or Respiration:Dyspnea.

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Open irritation test - 24.00 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24.00 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

The evidence for carcinogenicity of pentachlorophenol (PCP) is based on assays that utilized less than pure PCP. Contaminants of PCP include: tri- or tetra- chlorophenol, hexachlorobenzene, polychlorinated dibenzo-p-dioxins, or polychlorinated dibenzofurans. Indications are that positive evidence for carcinogenicity is from the contaminant(s) and not the PCP. This product is or contains a component that has been reported to be possibly carcinogenic based on its IARC, ACGIH, NTP, or EPA classification.

Limited evidence of carcinogenicity in animal studies

IARC:	2B - Group 2B: Possibly carcinogenic to humans (Pentachlorophenol)
NTP:	Reasonably anticipated to be a human carcinogen (Pentachlorophenol)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Convulsions

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinodon variegatus (sheepshead minnow) - 0.16 - 0.5 mg/l - 96.0 h
	LC50 - Carassius auratus (goldfish) - 0.16 - 0.38 mg/l - 96.0 h
	LC50 - Oncorhynchus mykiss (rainbow trout) - 0.075 mg/l - 96.0 h
	NOEC - other fish - 0.01 mg/l - 24.0 h
	LOEC - other fish - 0.1 mg/l - 24.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 0.30 - 1.30 mg/l - 48 h
Toxicity to algae	EC50 - No information available. - 0.36 mg/l - 10 d
	EC50 - Chlorella vulgaris (Fresh water algae) - 10.30 mg/l - 96 h
	Growth inhibition EC50 - Scenedesmus quadricauda (Green algae) - 0.08 mg/l - 96 h

12.2 Persistence and degradability

Biodegradability Result: 99 % - Biodegradable

12.3 Bioaccumulative potential

Bioaccumulation Oncorhynchus mykiss (rainbow trout) - 144 h
- 0.0912 mg/l

Bioconcentration factor (BCF): 482

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 3155 Class: 6.1 Packing group: II
Proper shipping name: Pentachlorophenol
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 3155 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: PENTACHLOROPHENOL
Marine pollutant: yes

IATA

UN number: 3155 Class: 6.1 Packing group: II
Proper shipping name: Pentachlorophenol

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Pentachlorophenol	87-86-5	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Pentachlorophenol	87-86-5	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Pentachlorophenol	87-86-5	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Pentachlorophenol	87-86-5	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H301	Toxic if swallowed.
H301 + H311	Toxic if swallowed or in contact with skin
H311	Toxic in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H400	Very toxic to aquatic life.

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	1

NFPA Rating

Health hazard:	4
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9 Revision Date: 12/29/2015 Print Date: 02/22/2016

SAFETY DATA SHEET

Creation Date 01-May-2012 **Revision Date** 11-Aug-2014 **Revision Number** 1

1. Identification

Product Name **Phenanthrene**

Cat No. : **AC130090000; AC130090050; AC130090500; AC130095000**

Synonyms No information available

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed



Precautionary Statements
Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth

Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Phenanthrene	85-01-8	>95

4. First-aid measures

General Advice If symptoms persist, call a physician.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Obtain medical attention. Wash off immediately with plenty of water for at least 15 minutes.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Clean mouth with water and drink afterwards plenty of water. Get medical attention if symptoms occur.

Most important symptoms/effects None reasonably foreseeable.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature Not applicable
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Do not allow run-off from fire fighting to enter drains or water courses.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
1	1	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.

Environmental Precautions Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system. Prevent product from entering drains. Local authorities should be advised if significant spillages cannot be contained. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal. Keep in suitable, closed containers for disposal.

7. Handling and storage

Handling Wear personal protective equipment. Ensure adequate ventilation. Do not get in eyes, on skin, or on clothing. Avoid ingestion and inhalation. Avoid dust formation.

Storage Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

- **Eye/face Protection** Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
- **Skin and body protection** Long sleeved clothing.
- **Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.
- **Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Beige
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	95 - 101 °C / 203 - 213.8 °F
Boiling Point/Range	336 °C / 636.8 °F
Flash Point	No information available
Evaporation Rate	Not applicable
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 116 °C
Vapor Density	Not applicable
Relative Density	1.063
Solubility	Insoluble in water
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	Not applicable
Decomposition temperature	No information available
Viscosity	Not applicable
Molecular Formula	C14 H10
Molecular Weight	178.23

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Phenanthrene	1.8 g/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Phenanthrene	85-01-8	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known

STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. The product contains following substances which are hazardous for the environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea

Phenanthrene	Not listed	LC50 = 3.2 mg/L 96h	Not listed	LC50 = 0.35 mg/L 48h

Persistence and Degradability Insoluble in water May persist

Bioaccumulation/ Accumulation No information available.

Mobility . Is not likely mobile in the environment due its low water solubility.

Component	log Pow
Phenanthrene	4.46

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE,SOLID, N.O.S.
Hazard Class 9
Packing Group III

IATA

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*
Hazard Class 9
Packing Group III

IMDG/IMO

UN-No UN3077
Proper Shipping Name ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
Hazard Class 9
Packing Group III

15. Regulatory information

All of the components in the product are on the following Inventory lists: X = listed

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Phenanthrene	X	X	-	201-581-5	-		X	X	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Phenanthrene	85-01-8	>95	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	No
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Phenanthrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Phenanthrene	5000 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Phenanthrene	X	X	X	-	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class Non-controlled

16. Other information

Prepared By Regulatory Affairs

Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date	01-May-2012
Revision Date	11-Aug-2014
Print Date	11-Aug-2014
Revision Summary	This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.10
Revision Date 09/06/2024
Print Date 09/06/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Phenol

Product Number : P5566
Brand : Sigma-Aldrich
Index-No. : 604-001-00-2
CAS-No. : 108-95-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Acute toxicity, Oral (Category 3), H301
Acute toxicity, Inhalation (Category 3), H331
Acute toxicity, Dermal (Category 3), H311

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Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Germ cell mutagenicity (Category 2), H341
Specific target organ toxicity - repeated exposure (Category 2), Nervous system, Kidney, Liver, Skin, H373
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word: Danger

Hazard Statements

H301 + H311 + H331	Toxic if swallowed, in contact with skin or if inhaled.
H314	Causes severe skin burns and eye damage.
H341	Suspected of causing genetic defects.
H373	May cause damage to organs (Nervous system, Kidney, Liver, Skin) through prolonged or repeated exposure.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P260	Do not breathe dust/ fume/ gas/ mist/ vapors/ spray.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P301 + P310 + P330	IF SWALLOWED: Immediately call a POISON CENTER/ doctor. Rinse mouth.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Immediately call a POISON CENTER/ doctor.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/ doctor.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

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2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Vesicant., Rapidly absorbed through skin.

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : Hydroxybenzene

Formula : C_6H_6O
Molecular weight : 94.11 g/mol
CAS-No. : 108-95-2
EC-No. : 203-632-7
Index-No. : 604-001-00-2

Component	Classification	Concentration
Phenol		
	Acute Tox. 3; Skin Corr. 1B; Eye Dam. 1; Muta. 2; STOT RE 2; Aquatic Acute 2; Aquatic Chronic 2; H301, H331, H311, H314, H318, H341, H373, H401, H411 Concentration limits: >= 3 %: Skin Corr. 1B, H314; 1 - < 3 %: Skin Irrit. 2, H315; 1 - < 3 %: Eye Irrit. 2, H319;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
First aiders need to protect themselves. Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Immediately call in physician. If breathing stops: immediately apply artificial respiration, if necessary also oxygen.

In case of skin contact
After contact with skin: rinse out with polyethylene glycol 400 or a mixture of polyethylene glycol 300/ethanol 2:1 and wash with plenty of water. If neither is available wash with plenty of water. Immediately take off contaminated clothing. Call a physician immediately.

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In case of eye contact
After eye contact: rinse out with plenty of water. Immediately call in ophthalmologist. Remove contact lenses.

If swallowed
If swallowed: give water to drink (two glasses at most). Seek medical advice immediately. In exceptional cases only, if medical care is not available within one hour, induce vomiting (only in persons who are wide awake and fully conscious), administer activated charcoal (20 - 40 g in a 10% slurry) and consult a doctor as quickly as possible. Do not attempt to neutralise.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air on intense heating.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Avoid generation and inhalation of dusts in all circumstances. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

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6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.
Storage stability Recommended storage temperature
2 - 8 °C
Handle and store under inert gas. Light sensitive.

Storage class
Storage class (TRGS 510): 6.1A: Combustible, acute toxic Cat. 1 and 2 / very toxic hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Phenol	108-95-2	TWA	5 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Not classifiable as a human carcinogen		

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		Danger of cutaneous absorption		
		TWA	5 ppm 19 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		C	15.6 ppm 60 mg/m3	USA. NIOSH Recommended Exposure Limits
		Potential for dermal absorption		
		TWA	5 ppm 19 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Skin designation		
		PEL	5 ppm 19 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		Skin		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Phenol	108-95-2	Phenol	250mg/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Tightly fitting safety goggles

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please

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contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Viton®
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Body Protection
Flame retardant antistatic protective clothing.

Respiratory protection
Recommended Filter type: Filter A-(P3)
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when dusts/vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	stinging
c)	Odor Threshold	0.005 ppm
d)	pH	6.0
e)	Melting point/freezing point	Melting point/ range: 38 - 43 °C (100 - 109 °F)
f)	Initial boiling point and boiling range	181.8 °C 359.2 °F at 1,013 hPa
g)	Flash point	79.0 °C (174.2 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 9.5 %(V) Lower explosion limit: 1.3 %(V)
k)	Vapor pressure	0.53 hPa at 20.0 °C (68.0 °F)
l)	Vapor density	3.2 at 20 °C(68 °F) - (Air = 1.0)
m)	Density	1.13 g/cm3 at 25 °C (77 °F) - DIN 51757
	Relative density	No data available

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n)	Water solubility	87 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 1.47 at 30 °C (86 °F) - (ECHA), Bioaccumulation is not expected.
p)	Autoignition temperature	715 °C (1319 °F) at 1,013 hPa
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	38.2 mN/m at 50.0 °C (122.0 °F)
Relative vapor density	3.2 at 20 °C (68 °F) - (Air = 1.0)

SECTION 10: Stability and reactivity

10.1 Reactivity

Forms explosive mixtures with air on intense heating.
A range from approx. 15 Kelvin below the flash point is to be rated as critical.
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .
Contains the following stabilizer(s):
Hypophosphorous acid (0.15 %)

10.3 Possibility of hazardous reactions

Exothermic reaction with:
Aluminum
Aldehydes
halogens
hydrogen peroxide
iron(III) compounds
Oxidizing agents
Strong acids
Strong bases
formaldehyde
Risk of explosion with:
nitrites
nitrates
salts of oxyhalogenic acids
peroxi compounds

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10.4 Conditions to avoid
Strong heating.

10.5 Incompatible materials
rubber, various plastics, various alloys, various metals

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Acute toxicity estimate Oral - 100.1 mg/kg
(Calculation method)
Acute toxicity estimate Oral - 100.1 mg/kg
(Expert judgment)
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Acute toxicity estimate Inhalation - 4 h - 0.51 mg/l - dust/mist(Calculation method)

Acute toxicity estimate Inhalation - 4 h - 0.51 mg/l - dust/mist

(Expert judgment)
Symptoms: Irritation, Lung edema
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)
Acute toxicity estimate Dermal - 660 mg/kg
(Calculation method)
LD50 Dermal - Rat - female - 660 mg/kg
(OECD Test Guideline 402)
No data available

Skin corrosion/irritation
Skin - In vitro study
Result: Causes burns.
(OECD Test Guideline 431)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Corrosive
(OECD Test Guideline 405)
Remarks: Causes serious eye damage.
Risk of blindness!

Respiratory or skin sensitization
Sensitisation test: - Guinea pig
Result: negative
Remarks: (IUCLID)

Germ cell mutagenicity
Suspected of causing genetic defects.
Test Type: Mutagenicity (mammal cell test): chromosome aberration.
Test system: Chinese hamster ovary cells
Metabolic activation: Metabolic activation

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Method: OECD Test Guideline 473
Result: positive
Test Type: Mutagenicity (mammal cell test): micronucleus.
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 487
Result: positive

Carcinogenicity
This product is or contains a component that is not classifiable as to its carcinogenicity based on its IARC, ACGIH, NTP, or EPA classification.

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.
- Nervous system, Kidney, Liver, Skin
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard
No data available

11.2 Additional Information

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Circulatory collapse, tachypnea, paralysis, Convulsions, Coma., necrosis of mouth and G.I. Tract, Jaundice, respiratory failure, cardiac arrest
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Stomach - Irregularities - Based on Human Evidence

Stomach - Irregularities - Based on Human Evidence

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Onchorhynchus clarki - 8.9 mg/l - 96 h

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	(US-EPA)
Toxicity to daphnia and other aquatic invertebrates	static test EC50 - Ceriodaphnia dubia (water flea) - 3.1 mg/l - 48 h (US-EPA)
Toxicity to algae	static test EC50 - Pseudokirchneriella subcapitata (algae) - 61.1 mg/l - 96 h (US-EPA)
Toxicity to bacteria	static test IC50 - microorganisms - 21 mg/l - 24 h Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	semi-static test NOEC - Fish - 0.077 mg/l - 60 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 0.16 mg/l - 16 d Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 100 h Result: 62 % - Readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation	Danio rerio (zebra fish) - 5 h at 25 °C - 2 mg/l(Phenol) Bioconcentration factor (BCF): 17.5 (OECD Test Guideline 305) Remarks: Does not bioaccumulate.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

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operates as MilliporeSigma in the US and Canada

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 1671 Class: 6.1 Packing group: II
Proper shipping name: Phenol, solid
Reportable Quantity (RQ): 1000 lbs
Poison Inhalation Hazard: No

IMDG
UN number: 1671 Class: 6.1 Packing group: II EMS-No: F-A, S-A
Proper shipping name: PHENOL, SOLID
Marine pollutant : yes

IATA
UN number: 1671 Class: 6.1 Packing group: II
Proper shipping name: Phenol, solid

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Phenol	108-95-2	1000	1000

SARA 304 Extremely Hazardous Substances Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Phenol	108-95-2	1000	1000

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity

Components	CAS-No.	Component TPQ (lbs)
Phenol	108-95-2	10000
Phenol	108-95-2	500*

*: Solid in the molten or powdered form (particles < 100 microns), in solution, or meeting the NFPA reactivity criteria

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

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SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Phenol	108-95-2	>= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know

No components are subject to the Massachusetts Right to Know Act.

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.10 Revision Date: 09/06/2024 Print Date: 09/06/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET

Version 3.10
Revision Date 03/03/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Potassium

Product Number : 244864
Brand : Aldrich

CAS-No. : 7440-09-7

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Skin corrosion (Category 1A), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231 + P232	Handle under inert gas. Protect from moisture.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.
May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : K
Molecular weight : 39.10 g/mol

Hazardous components

Component		Classification	Concentration
Potassium			
CAS-No. EC-No. Index-No.	7440-09-7 231-119-8 019-001-00-2	Water-react. 1; Skin Corr. 1A; Eye Dam. 1; H260, H314	>= 90 - <= 100 %
Paraffin oils			
CAS-No. EC-No.	8012-95-1 232-384-2	Carc. 1A; H350	>= 1 - < 5 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Potassium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Handle and store under inert gas.
Storage class (TRGS 510): Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Paraffin oils	8012-95-1	STEL	10.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation 2014 Adoption Not classifiable as a human carcinogen		
		Upper Respiratory Tract irritation 2014 Adoption Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Fragments Colour: grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 64 °C (147 °F)
f)	Initial boiling point and boiling range	774 °C (1,425 °F) at 1,013 hPa (760 mmHg)
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	No data available

	flammability or explosive limits	
k)	Vapour pressure	0.12 hPa (0.09 mmHg) at 260 °C (500 °F)
l)	Vapour density	No data available
m)	Relative density	0.860 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Oxidizing agents, Strong oxidizing agents, Carbon oxides, Reacts violently with water., Reacts with water to generate Hydrogen gas.

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Paraffin oils)

NTP: Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Paraffin oils)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 2257 Class: 4.3 Packing group: I
Proper shipping name: Potassium
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG
UN number: 2257 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: POTASSIUM

IATA
UN number: 2257 Class: 4.3 Packing group: I
Proper shipping name: Potassium
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Potassium	7440-09-7	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Potassium	7440-09-7	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Potassium	7440-09-7	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Paraffin oils	8012-95-1	1987-02-27

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.
Skin Corr.	Skin corrosion
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating
Health hazard: 3

Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	2

NFPA Rating

Health hazard:	3
Fire Hazard:	4
Reactivity Hazard:	2
Special hazard.I:	W

Further information

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Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.10 Revision Date: 03/03/2015 Print Date: 02/07/2016

SAFETY DATA SHEET

Version 3.9
Revision Date 05/23/2016
Print Date 06/21/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *p*-Xylene

Product Number : 95680
Brand : Sigma-Aldrich
Index-No. : 601-022-00-9

CAS-No. : 106-42-3

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Acute toxicity, Inhalation (Category 4), H332
Acute toxicity, Dermal (Category 4), H312
Skin irritation (Category 2), H315
Acute aquatic toxicity (Category 2), H401

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H226 Flammable liquid and vapour.
H312 + H332 Harmful in contact with skin or if inhaled
H315 Causes skin irritation.
H401 Toxic to aquatic life.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.

P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
P312	Call a POISON CENTER/doctor if you feel unwell.
P322	Specific measures (see supplemental first aid instructions on this label).
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 1,4-Dimethylbenzene

Formula : C_8H_{10}

Molecular weight : 106.17 g/mol

CAS-No. : 106-42-3

EC-No. : 203-396-5

Index-No. : 601-022-00-9

Hazardous components

Component	Classification	Concentration
p-Xylene		
	Flam. Liq. 3; Acute Tox. 4; Skin Irrit. 2; Aquatic Acute 2; H226, H312 + H332, H315, H401	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
p-Xylene	106-42-3	TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Eye & Upper Respiratory Tract irritation		

		Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Eye & Upper Respiratory Tract irritation Central Nervous System impairment Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		ST	150.000000 ppm 655.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	100.000000 ppm 435.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		
		TWA	100.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		TWA	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		
		STEL	150 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Upper Respiratory Tract irritation Eye irritation Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Not classifiable as a human carcinogen		

		TWA	100 ppm 435 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
p-Xylene	106-42-3	Methylhippuric acids	1.5g/g creatinine	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift (As soon as possible after exposure ceases)			
		Methylhippuric acids	1,500.0000 mg/g	Urine	ACGIH - Biological Exposure Indices (BEI)
		End of shift (As soon as possible after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 30 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	13.0 °C (55.4 °F)
f)	Initial boiling point and boiling range	137.0 - 138.0 °C (278.6 - 280.4 °F)
g)	Flash point	25.0 °C (77.0 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Upper explosion limit: 7 %(V) Lower explosion limit: 1.1 %(V)
k)	Vapour pressure	21.3 hPa (16.0 mmHg) at 37.7 °C (99.9 °F) 12.0 hPa (9.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	0.86 g/cm3
n)	Water solubility	0.2 g/l
o)	Partition coefficient: n-octanol/water	log Pow: 3.15
p)	Auto-ignition temperature	529.0 °C (984.2 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	28.3 mN/m at 20.0 °C (68.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 5,000 mg/kg

LD50 Oral - Rat - male - 3,523 mg/kg

LC50 Inhalation - Rat - 4 h - 4550 ppm
Remarks: Lungs, Thorax, or Respiration:Chronic pulmonary edema. Liver:Other changes. Blood:Changes in cell count (unspecified).

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Moderate skin irritation - 4 h

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC:	3 - Group 3: Not classifiable as to its carcinogenicity to humans (p-Xylene)
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

May cause reproductive disorders.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: ZE2625000

narcosis, Lung irritation, chest pain, pulmonary edema, Central nervous system depression, Gastrointestinal disturbance, Liver injury may occur., Kidney injury may occur., Blood disorders

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Oncorhynchus mykiss (rainbow trout) - 2.60 mg/l - 96 h
	LC50 - Carassius auratus (goldfish) - 18.00 mg/l - 24 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 35.50 - 63.10 mg/l - 48 h
Toxicity to algae	EC50 - Pseudokirchneriella subcapitata (green algae) - 3.20 - 4.40 mg/l - 72 h

12.2 Persistence and degradability

Biodegradability Result: 87.8 % - Readily biodegradable

12.3 Bioaccumulative potential

No data available

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1307 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: XYLENES

IATA

UN number: 1307 Class: 3 Packing group: III
Proper shipping name: Xylenes

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
p-Xylene	106-42-3	2007-07-01

SARA 311/312 Hazards

Fire Hazard, Acute Health Hazard, Chronic Health Hazard

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Flam. Liq.	Flammable liquids
H226	Flammable liquid and vapour.
H312	Harmful in contact with skin.
H312 + H332	Harmful in contact with skin or if inhaled
H315	Causes skin irritation.
H332	Harmful if inhaled.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	3
Reactivity Hazard:	0

Further information
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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.9 Revision Date: 05/23/2016 Print Date: 06/21/2016

SAFETY DATA SHEET

Creation Date 01-Jul-2010 **Revision Date** 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Pyrene**

Cat No. : **AC180830000; AC180830250; AC180831000; AC180835000**

Synonyms Benzo[def]phenanthrene

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Specific target organ toxicity (single exposure)	Category 3
Target Organs - Central nervous system (CNS).	
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Liver.	

Label Elements

Signal Word
Warning

Hazard Statements
Causes skin irritation
Causes serious eye irritation
May cause drowsiness or dizziness
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention
Wear protective gloves/protective clothing/eye protection/face protection
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray
Wash face, hands and any exposed skin thoroughly after handling
Do not get in eyes, on skin, or on clothing
Response
Get medical attention/advice if you feel unwell
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN: Wash with plenty of soap and water
Take off contaminated clothing and wash before reuse
If skin irritation occurs: Get medical advice/attention
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Storage
Store in a well-ventilated place. Keep container tightly closed
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Pyrene	129-00-0	>95

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.

Inhalation Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.

Ingestion Do not induce vomiting. Obtain medical attention.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Unsuitable Extinguishing Media No information available

Flash Point	210 °C / 410 °F
Method -	No information available
Autoignition Temperature	No information available
Explosion Limits	
Upper	No data available
Lower	No data available
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

NFPA

Health	Flammability	Instability	Physical hazards
2	1	0	N/A

6. Accidental release measures

Personal Precautions	Ensure adequate ventilation. Use personal protective equipment. Avoid dust formation.
Environmental Precautions	Should not be released into the environment. See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.
Methods for Containment and Clean Up	Sweep up or vacuum up spillage and collect in suitable container for disposal. Avoid dust formation.

7. Handling and storage

Handling	Ensure adequate ventilation. Wear personal protective equipment. Avoid contact with skin, eyes and clothing. Avoid dust formation. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid ingestion and inhalation.
Storage	Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines	This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Engineering Measures	Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection	Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.
Skin and body protection	Wear appropriate protective gloves and clothing to prevent skin exposure.
Respiratory Protection	Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Solid
Appearance	Yellow
Odor	Odorless
Odor Threshold	No information available
pH	No information available
Melting Point/Range	148 - 152 °C / 298 - 306 °F
Boiling Point/Range	393 °C / 739.4 °F @ 760 mmHg
Flash Point	210 °C / 410 °F
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	No information available
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C16 H10
Molecular Weight	202.25

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products. Excess heat. Avoid dust formation.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Pyrene	2700 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation Irritating to eyes and skin

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Pyrene	129-00-0	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure Central nervous system (CNS)
STOT - repeated exposure Liver

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available

Endocrine Disruptor Information No information available

Other Adverse Effects Tumorigenic effects have been reported in experimental animals. The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment. Do not empty into drains. Do not flush into surface water or sanitary sewer system. Do not allow material to contaminate ground water system.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Pyrene	Not listed	Oncorhynchus mykiss: LC50 > 2mg/L 96h	Not listed	EC50 48h 1.8 mg/L EC50 48h 0.002-0.003 mg/L

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility .

Component	log Pow
Pyrene	4.88

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT

UN-No UN3077
Proper Shipping Name Environmentally hazardous substance, solid, n.o.s
Proper technical name Pyrene
Hazard Class 9
Packing Group III

TDG

UN-No UN3077
Proper Shipping Name Environmentally hazardous substance, solid, n.o.s.
Hazard Class 9
Packing Group III

IATA

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substance, solid, n.o.s
Hazard Class	9
Packing Group	III

IMDG/IMO

UN-No	UN3077
Proper Shipping Name	Environmentally hazardous substance, solid, n.o.s
Hazard Class	9
Packing Group	III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Pyrene	X	X	-	204-927-3	-		X	X	X	X	-

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Pyrene	-	-	X	X

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Pyrene	5000 lb	5000 lb

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Pyrene	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

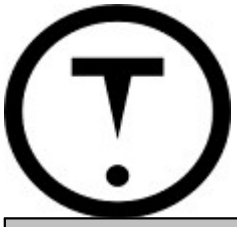
U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D2B Toxic materials



16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 01-Jul-2010
Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 6.7
Revision Date 10/27/2023
Print Date 07/13/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : *sec*-Butylbenzene

Product Number : B90408
Brand : Aldrich
CAS-No. : 135-98-8

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Flammable liquids (Category 3), H226
Acute toxicity, Oral (Category 4), H302
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

Signal Word	Warning
Hazard statement(s)	
H226	Flammable liquid and vapor.
H302	Harmful if swallowed.
H410	Very toxic to aquatic life with long lasting effects.
Precautionary statement(s)	
P210	Keep away from heat/ sparks/ open flames/ hot surfaces. No smoking.
P233	Keep container tightly closed.
P240	Ground/bond container and receiving equipment.
P241	Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242	Use only non-sparking tools.
P243	Take precautionary measures against static discharge.
P264	Wash skin thoroughly after handling.
P270	Do not eat, drink or smoke when using this product.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P301 + P312 + P330	IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	2-Phenylbutane
Formula	:	$C_{10}H_{14}$
Molecular weight	:	134.22 g/mol
CAS-No.	:	135-98-8
EC-No.	:	205-227-0

Component	Classification	Concentration
sec-Butylbenzene		
	Flam. Liq. 3; Acute Tox. 4; Aquatic Acute 1; Aquatic Chronic 1; H226, H302, H400, H410 M-Factor - Aquatic Acute: 1	<= 100 %

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower.

In case of eye contact
After eye contact: rinse out with plenty of water. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Carbon dioxide (CO2) Foam Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Carbon oxides
Combustible.
Vapors are heavier than air and may spread along floors.
Forms explosive mixtures with air at elevated temperatures.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters

In the event of fire, wear self-contained breathing apparatus.

5.4 Further information

Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition.
Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains. Risk of explosion.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Keep away from open flames, hot surfaces and sources of ignition.Take precautionary measures against static discharge.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class
Storage class (TRGS 510): 3: Flammable liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

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8.2 Exposure controls

Appropriate engineering controls

Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection

Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the EC approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection

Flame retardant antistatic protective clothing.

Respiratory protection

Recommended Filter type: Filter type ABEK
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure

Do not let product enter drains. Risk of explosion.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 75.5 °C (167.9 °F) - lit.
f)	Initial boiling point and boiling range	173 - 174 °C 343 - 345 °F - lit.
g)	Flash point	52.0 °C (125.6 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	Lower explosion limit: 0.8 %(V)
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	0.863 g/mL at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	418.0 °C (784.4 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

No data available

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SECTION 10: Stability and reactivity

10.1 Reactivity
Vapor/air-mixtures are explosive at intense warming.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
Strong oxidizing agents

10.4 Conditions to avoid
Heating.

10.5 Incompatible materials
various plastics

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,926 mg/kg
Remarks: (RTECS)
Inhalation: No data available
LD50 Dermal - Rabbit - > 13,760 mg/kg
Remarks: (RTECS)
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild eye irritant - 24 h
Remarks: (RTECS)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h
Remarks: (RTECS)

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is

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identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

RTECS: CY9100000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

After absorption:

Headache
Nausea
narcosis

Other dangerous properties can not be excluded.

Handle in accordance with good industrial hygiene and safety practice.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	semi-static test EC50 - Daphnia magna (Water flea) - 0.6 mg/l - 48 h (OECD Test Guideline 202) Remarks: (in analogy to similar products)
Toxicity to algae	static test ErC50 - Pseudokirchneriella subcapitata (green algae) - 0.42 mg/l - 72 h (OECD Test Guideline 201) Remarks: (in analogy to similar products)
	static test NOEC - Pseudokirchneriella subcapitata (green algae) - 0.26 mg/l - 72 h (OECD Test Guideline 201) Remarks: (in analogy to similar products)

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12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
Discharge into the environment must be avoided.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Reportable Quantity (RQ):
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG
UN number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant : yes
Marine pollutant : yes

IATA
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

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SECTION 15: Regulatory information

SARA 302 Components
This material does not contain any components with a section 302 EHS TPQ.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
sec-Butylbenzene	135-98-8	1993-04-24

SECTION 16: Other information

Further information
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact misbranding@sial.com.

Version: 6.7 Revision Date: 10/27/2023 Print Date: 07/13/2024

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SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **Selenium**

Cat No. : **AC419270000; AC419271000; AC419275000**

Synonyms None

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 3
Acute Inhalation Toxicity - Dusts and Mists	Category 3
Specific target organ toxicity - (repeated exposure)	Category 2

Label Elements

Signal Word
Danger

Hazard Statements
Toxic if swallowed
Toxic if inhaled
May cause damage to organs through prolonged or repeated exposure



Precautionary Statements
Prevention

Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Do not breathe dust/fume/gas/mist/vapors/spray

Response

Get medical attention/advice if you feel unwell

Inhalation

IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Call a POISON CENTER or doctor/physician

Ingestion

IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician
Rinse mouth

Storage

Store locked up
Store in a well-ventilated place. Keep container tightly closed

Disposal

Dispose of contents/container to an approved waste disposal plant

Hazards not otherwise classified (HNOC)

May cause long lasting harmful effects to aquatic life

3. Composition / information on ingredients

Component	CAS-No	Weight %
Selenium	7782-49-2	> 99.5

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes.

Inhalation Remove from exposure, lie down. Move to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Immediate medical attention is required.

Ingestion Do not induce vomiting. Never give anything by mouth to an unconscious person. Drink plenty of water. Call a physician immediately. If possible drink milk afterwards.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical

Vapors may form explosive mixtures with air.

Hazardous Combustion Products
None known
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
3	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Sweep up or vacuum up spillage and collect in suitable container for disposal.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Use only in area provided with appropriate exhaust ventilation.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed. Keep under nitrogen.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH
Selenium	TWA: 0.2 mg/m³	(Vacated) TWA: 0.2 mg/m³	IDLH: 1 mg/m³ TWA: 0.2 mg/m³

Component	Quebec	Mexico OEL (TWA)	Ontario TWAEV
Selenium	TWA: 0.2 mg/m³	TWA: 0.2 mg/m³	TWA: 0.2 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: The National Institute for Occupational Safety and Health Immediately Dangerous to Life or Health

Engineering Measures Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection A NIOSH/MSHA approved air purifying dust or mist respirator or European Standard EN 149.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Grey
Odor	No information available
Odor Threshold	No information available
pH	No information available
Melting Point/Range	217 - 222 °C / 422.6 - 431.6 °F
Boiling Point/Range	685 °C / 1265 °F
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	1 mmHg @ 345 °C
Vapor Density	No information available
Relative Density	4.810
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	Se
Molecular Weight	78.96

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Acids, Strong oxidizing agents, Fluorine, oxygen, Metals

Hazardous Decomposition Products None under normal use conditions

Hazardous Polymerization Hazardous polymerization does not occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Selenium	6700 mg/kg (Rat)	Not listed	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Selenium	7782-49-2	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT
- **UN-No** UN3283
- **Hazard Class** 6.1
- **Packing Group** III

TDG
- **UN-No** UN3283
- **Hazard Class** 6.1
- **Packing Group** III

IATA
- **UN-No** 3283
- **Proper Shipping Name** SELENIUM COMPOUND, SOLID, N.O.S.
- **Hazard Class** 6.1
- **Packing Group** III

IMDG/IMO
- **UN-No** 3283
- **Proper Shipping Name** SELENIUM COMPOUND, SOLID, N.O.S.
- **Hazard Class** 6.1
- **Packing Group** III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Selenium	X	X	-	231-957-4	-		X	-	X	X	X

Legend:
X - Listed
E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Selenium	7782-49-2	> 99.5	1.0

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Selenium	-	-	X	X

Clean Air Act Not applicable

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Selenium	X		-

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Selenium	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Selenium	X	X	X	X	X

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada
This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1A Very toxic materials
D2B Toxic materials



16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer
The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 4.6
Revision Date 12/02/2015
Print Date 02/09/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Silver

Product Number : 327093
Brand : Aldrich

CAS-No. : 7440-22-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : Ag
Molecular weight : 107.87 g/mol
CAS-No. : 7440-22-4
EC-No. : 231-131-3

Hazardous components

Component	Classification	Concentration
Silver		
		<= 100 %

4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Silver/silver oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Air sensitive. Store under inert gas. Keep in a dry place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Silver	7440-22-4	TWA	0.010000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.010000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Argyria		
		TWA	0.010000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.010000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	0.010000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.100000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Argyria		
		TWA	0.010000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	0.1 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Argyria		
		TWA	0.01 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 960 °C (1,760 °F) - lit.
f)	Initial boiling point and boiling range	2,212 °C (4,014 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	10.49 g/cm3
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxygen, Strong acids and strong bases

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - > 5,000 mg/kg

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Rat - Unreported
Tumorigenic:Tumors at site or application.

Carcinogenicity classification not possible from current data.

IARC:	No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.
NTP:	No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

May cause argyria (a slate-gray or bluish discoloration of the skin and deep tissues due to the deposit of insoluble albuminate of silver).

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3077 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substances, solid, n.o.s. (Silver)
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date

Silver	7440-22-4	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Silver	7440-22-4	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 12/02/2015 Print Date: 02/09/2016

Fisher Scientific

Part of Thermo Fisher Scientific

SAFETY DATA SHEET

Revision Date 10-Feb-2015 **Revision Number** 1

1. Identification

Product Name **2-(2,4,5-Trichlorophenoxy)propionic acid**

Cat No. : **AC171700000; AC171700050**

Synonyms Silvex

Recommended Use Laboratory chemicals.

Uses advised against No Information available

Details of the supplier of the safety data sheet

Company
Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Entity / Business Name
Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Acute oral toxicity	Category 4
Skin Corrosion/irritation	Category 2
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 2

Label Elements

Signal Word
Warning

Hazard Statements
Harmful if swallowed
Causes skin irritation
Causes serious eye irritation
Suspected of causing cancer



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Wear eye/face protection
Response
IF exposed or concerned: Get medical attention/advice
Skin
IF ON SKIN: Wash with plenty of soap and water
If skin irritation occurs: Get medical advice/attention
Take off contaminated clothing and wash before reuse
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Storage
Store locked up
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Very toxic to aquatic life with long lasting effects

3. Composition / information on ingredients

Component	CAS-No	Weight %
Silvex (2,4,5-TP)	93-72-1	97

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Obtain medical attention.

Inhalation Remove from exposure, lie down. Move to fresh air. Obtain medical attention.

Ingestion Clean mouth with water. Get medical attention.

Most important symptoms/effects No information available.
Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. chemical foam.

Unsuitable Extinguishing Media No information available

Flash Point No information available
Method - No information available

Autoignition Temperature No information available
Explosion Limits
Upper No data available
Lower No data available
Sensitivity to Mechanical Impact No information available
Sensitivity to Static Discharge No information available

Specific Hazards Arising from the Chemical
Keep product and empty container away from heat and sources of ignition.

Hazardous Combustion Products
Hydrogen chloride gas Carbon monoxide (CO) Carbon dioxide (CO_2)
Protective Equipment and Precautions for Firefighters
As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	0	0	N/A

6. Accidental release measures

Personal Precautions Ensure adequate ventilation. Use personal protective equipment.
Environmental Precautions See Section 12 for additional ecological information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Avoid dust formation. Sweep up or vacuum up spillage and collect in suitable container for disposal. Do not let this chemical enter the environment.

7. Handling and storage

Handling Avoid contact with skin and eyes. Do not breathe dust. Do not breathe vapors or spray mist. Do not ingest.

Storage Keep in a dry, cool and well-ventilated place. Keep container tightly closed.

8. Exposure controls / personal protection

Exposure Guidelines This product does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.

Engineering Measures Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment

Eye/face Protection Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Powder Solid
Appearance	Beige
Odor	Slight
Odor Threshold	No information available
pH	No information available
Melting Point/Range	177 - 181 °C / 350.6 - 357.8 °F
Boiling Point/Range	No information available
Flash Point	No information available
Evaporation Rate	No information available
Flammability (solid,gas)	No information available
Flammability or explosive limits	
Upper	No data available
Lower	No data available
Vapor Pressure	No information available
Vapor Density	No information available
Relative Density	1.209
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	No information available
Decomposition Temperature	No information available
Viscosity	No information available
Molecular Formula	C9 H7 Cl3 O3
Molecular Weight	269.51

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability Stable under normal conditions.

Conditions to Avoid Incompatible products.

Incompatible Materials Strong oxidizing agents

Hazardous Decomposition Products Hydrogen chloride gas, Carbon monoxide (CO), Carbon dioxide (CO_2)

Hazardous Polymerization No information available.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information No acute toxicity information is available for this product

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Silvex (2,4,5-TP)	650 mg/kg (Rat)	3200 mg/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation No information available

Sensitization No information available

Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Silvex (2,4,5-TP)	93-72-1	Group 2B	Not listed	Not listed	X	Not listed

Mutagenic Effects No information available

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure None known

Aspiration hazard No information available

Symptoms / effects,both acute and delayed No information available
Endocrine Disruptor Information No information available

Other Adverse Effects See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity
Do not empty into drains.

Persistence and Degradability No information available
Bioaccumulation/ Accumulation No information available.

Mobility No information available.

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

14. Transport information

DOT Not regulated
TDG Not regulated
IATA
- **UN-No** 3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.*
- **Hazard Class** 9
- **Packing Group** III

IMDG/IMO
- **UN-No** 3077
- **Proper Shipping Name** ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S.
- **Hazard Class** 9
- **Packing Group** III

15. Regulatory information

International Inventories

Component	TSCA	DSL	NDSL	EINECS	ELINCS	NLP	PICCS	ENCS	AICS	IECSC	KECL
Silvex (2,4,5-TP)	-	-	-	202-271-2	-		X	X	-	-	-

Legend:
X - Listed

E - Indicates a substance that is the subject of a Section 5(e) Consent order under TSCA.
F - Indicates a substance that is the subject of a Section 5(f) Rule under TSCA.
N - Indicates a polymeric substance containing no free-radical initiator in its inventory name but is considered to cover the designated polymer made with any free-radical initiator regardless of the amount used.
P - Indicates a commenced PMN substance
R - Indicates a substance that is the subject of a Section 6 risk management rule under TSCA.
S - Indicates a substance that is identified in a proposed or final Significant New Use Rule
T - Indicates a substance that is the subject of a Section 4 test rule under TSCA.
XU - Indicates a substance exempt from reporting under the Inventory Update Rule, i.e. Partial Updating of the TSCA Inventory Data Base Production and Site Reports (40 CFR 710(B).
Y1 - Indicates an exempt polymer that has a number-average molecular weight of 1,000 or greater.
Y2 - Indicates an exempt polymer that is a polyester and is made only from reactants included in a specified list of low concern reactants that comprises one of the eligibility criteria for the exemption rule.

U.S. Federal Regulations

TSCA 12(b) Not applicable

SARA 313 Not applicable

SARA 311/312 Hazardous Categorization

Acute Health Hazard	Yes
Chronic Health Hazard	Yes
Fire Hazard	No
Sudden Release of Pressure Hazard	No
Reactive Hazard	No

Clean Water Act

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Silvex (2,4,5-TP)	X	100 lb	-	-

Clean Air Act Not applicable

OSHA Occupational Safety and Health Administration
Not applicable

CERCLA
This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Silvex (2,4,5-TP)	100 lb	-

California Proposition 65 This product does not contain any Proposition 65 chemicals

State Right-to-Know

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Silvex (2,4,5-TP)	X	X	X	X	-

U.S. Department of Transportation

Reportable Quantity (RQ):	N
DOT Marine Pollutant	N
DOT Severe Marine Pollutant	N

U.S. Department of Homeland Security
This product does not contain any DHS chemicals.

Other International Regulations

Mexico - Grade No information available

Canada

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations (CPR) and the MSDS contains all the information required by the CPR

WHMIS Hazard Class D1B Toxic materials
D2B Toxic materials



16. Other information

Prepared By Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Revision Date 10-Feb-2015
Print Date 10-Feb-2015
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS)

Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of SDS

SAFETY DATA SHEET

Version 4.11
Revision Date 03/05/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Sodium

Product Number : 483745
Brand : Aldrich

CAS-No. : 7440-23-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Skin corrosion (Category 1B), H314
Serious eye damage (Category 1), H318
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)

H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P223	Keep away from any possible contact with water, because of violent reaction and possible flash fire.

P231 + P232	Handle under inert gas. Protect from moisture.
P260	Do not breathe dust or mist.
P264	Wash skin thoroughly after handling.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P281	Use personal protective equipment as required.
P301 + P330 + P331	IF SWALLOWED: Rinse mouth. Do NOT induce vomiting.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P310	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Immediately call a POISON CENTER or doctor/ physician.
P305 + P351 + P338 + P310	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER or doctor/ physician.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P363	Wash contaminated clothing before reuse.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P402 + P404	Store in a dry place. Store in a closed container.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Reacts violently with water.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.2 Mixtures

Formula : Na
Molecular weight : 22.99 g/mol

Hazardous components

Component		Classification	Concentration
Sodium			
CAS-No. EC-No. Index-No.	7440-23-5 231-132-9 011-001-00-0	Water-react. 1; Skin Corr. 1B; Eye Dam. 1; H260, H314	>= 90 - <= 100 %
Paraffin oils			
CAS-No. EC-No.	8012-95-1 232-384-2	Carc. 1A; H350	>= 90 - <= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.Continue rinsing eyes during transport to hospital.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid formation of dust and aerosols.Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Handle and store under inert gas. Air sensitive.
Storage class (TRGS 510): Hazardous materials, which set free flammable gases upon contact with water

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Paraffin oils	8012-95-1	STEL	10.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Upper Respiratory Tract irritation 2014 Adoption Not classifiable as a human carcinogen		
		Upper Respiratory Tract irritation 2014 Adoption Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		TWA	5.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		
		TWA	5.000000 mg/m3	USA. ACGIH Threshold Limit Values (TLV)
		Upper Respiratory Tract irritation Not classifiable as a human carcinogen		
		TWA	5.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	10.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		Upper Respiratory Tract irritation Exposure by all routes should be carefully controlled to levels as low as possible. Suspected human carcinogen		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Pieces
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 97.8 °C (208.0 °F) - lit.
f)	Initial boiling point and boiling range	883 °C (1,621 °F) - lit.
g)	Flash point	82 °C (180 °F)
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.97 g/cm3

n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Air Do not allow water to enter container.
Exposure to moisture

10.5 Incompatible materials
Oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (Paraffin oils)

NTP: Known to be human carcinogenThe reference note has been added by TD based on the background information of the NTP. (Paraffin oils)

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available
No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, spasm, inflammation and edema of the larynx, spasm, inflammation and edema of the bronchi, pneumonitis, pulmonary edema, Material is extremely destructive to tissue of the mucous membranes and upper respiratory tract, eyes, and skin., Aspiration may lead to:, lipid pneumonia, Effects due to ingestion may include:, laxative effect, Gastrointestinal disturbance, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1428 Class: 4.3 Packing group: I
Proper shipping name: Sodium
Reportable Quantity (RQ): 10 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1428 Class: 4.3 Packing group: I EMS-No: F-G, S-N
Proper shipping name: SODIUM

IATA
UN number: 1428 Class: 4.3 Packing group: I
Proper shipping name: Sodium
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Reactivity Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Sodium	7440-23-5	1993-04-24
Paraffin oils	8012-95-1	2007-03-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Paraffin oils	8012-95-1	1987-02-27

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Carc.	Carcinogenicity
Eye Dam.	Serious eye damage
H260	In contact with water releases flammable gases which may ignite spontaneously.
H314	Causes severe skin burns and eye damage.
H318	Causes serious eye damage.
H350	May cause cancer.
Skin Corr.	Skin corrosion
Water-react.	Substances and mixtures, which in contact with water, emit flammable gases

HMIS Rating

Health hazard:	3
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	2

NFPA Rating

Health hazard:	3
Fire Hazard:	4
Reactivity Hazard:	2
Special hazard.I:	W

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.11 Revision Date: 03/05/2015 Print Date: 02/07/2016

SAFETY DATA SHEET

Version 3.5
Revision Date 11/04/2015
Print Date 02/22/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *tert*-Butylbenzene

Product Number : B90602
Brand : Aldrich

CAS-No. : 98-06-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Eye irritation (Category 2A), H319
Acute aquatic toxicity (Category 2), H401
Chronic aquatic toxicity (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H226 Flammable liquid and vapour.
H319 Causes serious eye irritation.
H411 Toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.
P243 Take precautionary measures against static discharge.

P264	Wash skin thoroughly after handling.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P391	Collect spillage.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : 2-Methyl-2-phenylpropane

Formula : $C_{10}H_{14}$

Molecular weight : 134.22 g/mol

CAS-No. : 98-06-6

EC-No. : 202-632-4

Hazardous components

Component	Classification	Concentration
tert-Butylbenzene		
	Flam. Liq. 3; Eye Irrit. 2A; Aquatic Acute 2; Aquatic Chronic 2; H226, H319, H411	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Store in cool place. Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Impervious clothing, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -58 °C (-72 °F) - lit.
f)	Initial boiling point and boiling range	169 °C (336 °F) - lit.
g)	Flash point	34.0 °C (93.2 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	Lower explosion limit: 0.8 %(V)

	flammability or explosive limits	
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.867 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 3.80
p)	Auto-ignition temperature	450.0 °C (842.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 3,045 mg/kg
Remarks: Behavioral:Somnolence (general depressed activity). Behavioral:Tremor. Gastrointestinal:Changes in structure or function of salivary glands.

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: CY9120000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC0 - Leuciscus idus (Golden orfe) - 44 mg/l - 48.0 h
	LC50 - Leuciscus idus (Golden orfe) - 65 mg/l - 48.0 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 41 mg/l - 24 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butyl benzenes
Marine pollutant:yes
Poison Inhalation Hazard: No

IMDG
UN number: 2709 Class: 3 Packing group: III EMS-No: F-E, S-D
Proper shipping name: BUTYLBENZENES
Marine pollutant:yes

IATA
UN number: 2709 Class: 3 Packing group: III
Proper shipping name: Butylbenzenes

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard

Massachusetts Right To Know Components
No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
tert-Butylbenzene	98-06-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
tert-Butylbenzene	98-06-6	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Eye Irrit.	Eye irritation
Flam. Liq.	Flammable liquids

H226	Flammable liquid and vapour.
H319	Causes serious eye irritation.
H401	Toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.5 Revision Date: 11/04/2015 Print Date: 02/22/2016

SAFETY DATA SHEET

Version 8.10
Revision Date 09/06/2024
Print Date 09/07/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : Tetrachloroethylene

Product Number : 371696
Brand : Sigma-Aldrich
Index-No. : 602-028-00-4
CAS-No. : 127-18-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Skin sensitization (Category 1), H317

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operates as MilliporeSigma in the US and Canada

Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Short-term (acute) aquatic hazard (Category 2), H401
Long-term (chronic) aquatic hazard (Category 2), H411

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word: Warning

Hazard Statements

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H411	Toxic to aquatic life with long lasting effects.

Precautionary Statements

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing mist or vapors.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P272	Contaminated work clothing must not be allowed out of the workplace.
P273	Avoid release to the environment.
P280	Wear protective gloves/ protective clothing/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P333 + P313	If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P391	Collect spillage.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms	:	Perchloroethylene PCE
Formula	:	C_2Cl_4
Molecular weight	:	165.83 g/mol
CAS-No.	:	127-18-4
EC-No.	:	204-825-9
Index-No.	:	602-028-00-4

Component	Classification	Concentration
Tetrachlorethylene		
	Skin Irrit. 2; Eye Irrit. 2A; Skin Sens. 1; Carc. 2; STOT SE 3; Aquatic Acute 2; Aquatic Chronic 2; H315, H319, H317, H351, H336, H401, H411 Concentration limits: >= 20 %: STOT SE 3, H336;	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Advice for non-emergency personnel: Do not breathe vapors, aerosols. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.

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Hygiene measures
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Keep in a well-ventilated place. Keep locked up or in an area accessible only to qualified or authorized persons.

Storage class
Storage class (TRGS 510): 6.1C: Combustible, acute toxic Cat.3 / toxic compounds or compounds which causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Tetrachlorethylene	127-18-4	TWA	25 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Confirmed animal carcinogen with unknown relevance to humans		
		STEL	100 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Confirmed animal carcinogen with unknown relevance to humans		
		Potential Occupational Carcinogen		

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		TWA	100 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		CEIL	200 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Peak	300 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		PEL	25 ppm 170 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		STEL	100 ppm 685 mg/m3	California permissible exposure limits for chemical contaminants (Title 8, Article 107)
		C	300 ppm	California permissible exposure limits for chemical contaminants (Title 8, Article 107)

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Tetrachlorethylene	127-18-4	Tetrachloroethylene	3parts per million	In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
	Remarks	Prior to shift (16 hours after exposure ceases)			
		Tetrachloroethylene	0.5 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		Prior to shift (16 hours after exposure ceases)			

8.2 Exposure controls

Appropriate engineering controls
Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Full contact
Material: Viton®
Minimum layer thickness: 0.7 mm

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Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).
Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 240 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter A (acc. to DIN 3181) for vapours of organic compounds
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.
required when vapours/aerosols are generated. Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Color: colorless
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: -22 °C (-8 °F) - lit.
f)	Initial boiling point and boiling range	121 °C 250 °F - lit.
g)	Flash point	()No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	No data available

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	flammability or explosive limits	
k)	Vapor pressure	25.3 hPa at 25.0 °C (77.0 °F) 17.3 hPa at 20.0 °C(68.0 °F)
l)	Vapor density	No data available
m)	Density	1.623 g/cm3 at 25 °C (77 °F) - lit.
	Relative density	No data available
n)	Water solubility	0.15 g/l at 25 °C (77 °F)
o)	Partition coefficient: n-octanol/water	log Pow: 2.53 at 23 °C (73 °F) - Bioaccumulation is not expected.
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information

Surface tension	32.1 mN/m at 20 °C (68 °F)

SECTION 10: Stability and reactivity

10.1 Reactivity
No data available

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Risk of explosion with:
Alkali metals
Aluminum
sodium amide
Barium
nitrogen dioxide
Oxygen
with
alkali hydroxides
Exothermic reaction with:
strong alkalis
Alkaline earth metals
strong alkalis
Light metals
Powdered metals

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Oxidizing agents
Strong acids
Strong bases
nitrous gases
Risk of ignition or formation of inflammable gases or vapours with:
zinc oxide
with
Aluminum

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
various plastics

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male and female - 3,420 mg/kg
(OECD Test Guideline 401)
Remarks: (ECHA)
Inhalation: No data available
Dermal: No data available
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 4 h
(OECD Test Guideline 404)
Remarks: (ECHA)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h
(Draize Test)
Remarks: (RTECS)

Respiratory or skin sensitization
Local lymph node assay (LLNA) - Mouse
Result: May cause sensitization by skin contact.
(OECD Test Guideline 429)
Remarks: (ECHA)

Germ cell mutagenicity
Test Type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary cells
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 473

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Result: negative
Remarks: (ECHA)
Test Type: Ames test
Test system: Salmonella typhimurium
Metabolic activation: without metabolic activation
Method: OECD Test Guideline 471
Result: negative
Remarks: (ECHA)

Test Type: Micronucleus test
Species: Mouse

Application Route: Intraperitoneal
Method: OECD Test Guideline 474
Result: negative
Remarks: (ECHA)

Carcinogenicity
Suspected of causing cancer.

IARC:	2A - Group 2A: Probably carcinogenic to humans (Tetrachlorethylene)
NTP:	RAHC - Reasonably anticipated to be a human carcinogen (Tetrachlorethylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

11.2 Additional Information

Repeated dose toxicity - Mouse - female - Oral - LOAEL (Lowest observed adverse effect level) - 390 mg/kg

RTECS: KX3850000
narcosis, Liver injury may occur., Kidney injury may occur.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	flow-through test LC50 - Oncorhynchus mykiss (rainbow trout) - 5 mg/l - 96 h Remarks: (ECHA)

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Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 7.50 mg/l - 48 h
Toxicity to algae	ErC50 - Chlamydomonas reinhardtii (green algae) - 3.64 mg/l - 72 h Remarks: (ECHA)
Toxicity to fish(Chronic toxicity)	flow-through test NOEC - Jordanella floridae - 1.99 mg/l - 10 d Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates(Chronic toxicity)	semi-static test NOEC - Daphnia magna (Water flea) - 0.51 mg/l - 28 d Remarks: (ECHA)

12.2 Persistence and degradability

Biodegradability	aerobic - Exposure time 28 d Result: 11 % - Not readily biodegradable. (OECD Test Guideline 301C)

12.3 Bioaccumulative potential

Bioaccumulation	Lepomis macrochirus (Bluegill) - 21 d - 0.00343 mg/l(Tetrachlorethylene) Bioconcentration factor (BCF): 49

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product

Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

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SECTION 14: Transport information

DOT (US)
UN number: 1897 Class: 6.1 Packing group: III
Proper shipping name: Tetrachloroethylene
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 100 lbs
Reportable Quantity (RQ): 10 lbs
Reportable Quantity (RQ): 10 lbs
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG
UN number: 1897 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TETRACHLOROETHYLENE
Marine pollutant : yes
Marine pollutant : yes

IATA
UN number: 1897 Class: 6.1 Packing group: III
Proper shipping name: Tetrachloroethylene

SECTION 15: Regulatory information

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Tetrachlorethylene	127-18-4	100	100
Tetrachlorethylene	127-18-4	100	100 (D039)
Tetrachlorethylene	127-18-4	10	10 (F001)
Tetrachlorethylene	127-18-4	10	10 (F002)

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

Tetrachlorethylene 127-18-4 >= 90 - <= 100 %

US State Regulations

Massachusetts Right To Know
Tetrachlorethylene 127-18-4

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Pennsylvania Right To Know

Tetrachlorethylene 127-18-4

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Tetrachlorethylene 127-18-4

Washington Chemicals of High Concern

Tetrachlorethylene 127-18-4

California Prop. 65

WARNING: This product can expose you to chemicals including Tetrachlorethylene, which is/are known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : All substances listed as active on the TSCA inventory

TSCA list

No substances are subject to a Significant New Use Rule.

No substances are subject to TSCA 12(b) export notification requirements.

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 8.10 Revision Date: 09/06/2024 Print Date: 09/07/2024

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Thallium

SAFETY DATA SHEET

1 PRODUCT AND SUPPLIER IDENTIFICATION

Product Name: Thallium Solid

Formula: Tl

Supplier: ESPI Metals
1050 Benson Way
Ashland, OR 97520

Telephone: 800-638-2581

Fax: 541-488-8313

Email: sales@espimetals.com

Emergency: Infotrac 800-535-5053 (US) or 352-323-3500 (24 hour)

Recommended Uses: Scientific Research

2 HAZARDS IDENTIFICATION

GHS Classification (29 CFR 1910.1200): Acute toxicity - oral, category 2.

GHS Label Elements:



Signal Word: Danger

Hazard Statements: H300 Fatal if swallowed.

Precautionary Statements: P264 Wash hands thoroughly after handling, P270 Do not eat, drink or smoke when using this product, P301+P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician, P330 Rinse mouth, P405 Store locked up, P501 Dispose of contents/container in accordance with local, state or federal regulations.

3 COMPOSITION/INFORMATION ON INGREDIENTS

Ingredient: Thallium

CAS#: 7440-28-0

%: 100

EC#: 231-138-1

4 FIRST AID MEASURES

General Measures: Emergency responders should take care to avoid secondary exposure to thallium if it is present. Wear appropriate protective equipment.

INHALATION: Remove to fresh air, keep warm and quiet, give oxygen if breathing is difficult. Seek immediate medical attention. If mouth-to-mouth is necessary always use a barrier or bag-valve-mask device.

INGESTION: Rinse mouth with water. Do not induce vomiting. Seek immediate medical attention. Never induce vomiting or give anything by mouth to an unconscious person.

SKIN: Remove contaminated clothing, wash affected area with soap and water taking care not to break the skin and to cover all open wounds. Seek medical attention. Contaminated clothing should be safely contained and properly disposed of.

EYES: Flush eyes with lukewarm water, including under upper and lower eyelids, for at least 15 minutes. Seek medical attention immediately.

Most Important Symptoms/Effects, Acute and Delayed: Symptoms are usually delayed and include gastrointestinal distress and neurological symptoms. See section 11 for more information.

Indication of Immediate Medical Attention and Special Treatment: No other information available.

5 FIREFIGHTING MEASURES

Extinguishing Media: Use extinguishing media suitable for surrounding materials and type of fire.

Unsuitable Extinguishing Media: No further information available.

Specific Hazards Arising from the Material: Under fire conditions, thallium may release highly toxic fumes or gases.

Special Protective Equipment and Precautions for Firefighters: Full face, self-contained breathing apparatus and full protective clothing.

6 ACCIDENTAL RELEASE MEASURES

Personal Precautions, Protective Equipment, and Emergency Procedures: Wear appropriate respiratory and protective equipment specified in section 8. Isolate spill area and provide ventilation. Avoid breathing dust or fume. Avoid contact with skin and eyes. Eliminate all sources of ignition.

Methods and Materials for Containment and Cleaning Up: Scoop up or vacuum with a system utilizing a HEPA filtration system and place in properly labeled sealed containers. Special precautions must be taken when changing filters on HEPA vacuum cleaners used to clean up hazardous materials. Avoid creating dusts. Avoid contamination of air and water.

Environmental Precautions: Do not allow to enter drains or to be released to the environment.

7 HANDLING AND STORAGE

Precautions for Safe Handling: Wear appropriate respiratory and protective equipment specified in section 8. Only trained personnel should work with this product. Handle in a well-ventilated area. Avoid exposure to high temperature. Avoid breathing fumes. Avoid contact with skin and eyes. Wash thoroughly before eating or smoking.

Conditions for Safe Storage, Including Any Incompatibilities: Store under dry, inert gas such as argon, or can also be stored under deaerated water. Store in sealed unbreakable containers; the original labeled shipping container when possible. Store in an area that is cool, dry and temperature-controlled, away from direct sunlight, heat and ignition sources or where freezing is possible. Do not store together with acids, halogens or oxidizers. See section 10 for more information on incompatible materials.

8 EXPOSURE CONTROLS AND PERSONAL PROTECTION

Exposure Limits: Thallium (Soluble compounds, as Tl)

OSHA/PEL: 0.1 mg/m^3

ACGIH/TLV: 0.02 mg/m^3(inhalable)

Appropriate Engineering Controls: Handle in an enclosed, controlled process under dry argon. Whenever possible the use of local exhaust ventilation, process enclosure or other engineering controls is the preferred method of controlling exposure to meet established occupational exposure limits. Use good housekeeping and sanitation practices. Do not use tobacco or food in work area. Wash thoroughly before eating or smoking. Clothing worn in areas of exposure to thallium dust or vapor should be restricted to the workplace and stored in special lockers.

Individual Protection Measures, Such as Personal Protective Equipment:

Respiratory Protection: When potential exposures are above the occupational limits, approved respirators must be used.

Eye Protection: Splash goggles or safety glasses.

Skin Protection: Wear impermeable gloves, protective work clothing as necessary.

9 PHYSICAL AND CHEMICAL PROPERTIES

Appearance:

Form: Rod

Color: Gray metallic

Odor: Odorless

Odor Threshold: Not determined

pH: N/A

Melting Point: 303.5 ^{o}C

Boiling Point: 1457±10 ^{o}C

Flash Point: N/A

Evaporation Rate: N/A

Flammability: No data

Upper Flammable Limit: No data

Lower Flammable Limit: No data

Vapor Pressure: 1 mm Hg @ 825 ^{o}C

Vapor Density: N/A

Relative Density (Specific Gravity): 11.85 g/cc

Solubility in H_2O: Insoluble

Partition Coefficient (n-octanol/water): Not determined

Autoignition Temperature: No data

Decomposition Temperature: No data

Viscosity: N/A

10 STABILITY AND REACTIVITY

Reactivity: No data

Chemical Stability: Stable under recommended storage conditions.

Possibility of Hazardous Reactions: High temperatures will generate toxic thallium oxide fumes.

Conditions to Avoid: Avoid high temperatures, reacts slowly with moist air.

Incompatible Materials: Oxidizing agents, strong acids, halogens, air and moisture.

Hazardous Decomposition Products: Thallium oxide fume.

11 TOXICOLOGICAL INFORMATION

Likely Routes of Exposure: Inhalation, skin and eyes.

Symptoms of Exposure: Abdominal pain and vomiting, extreme pain in the extremities, lethargy, hair loss.

Acute and Chronic Effects: Almost all of the available information refers to ingestion of thallium compounds, largely due to accidental ingestion, intentional poisoning and suicide attempts. Adverse reactions are dose dependent and occur in 3 stages. Massive doses may cause gastrointestinal distress (nausea, vomiting and abdominal pain) within 30 minutes but symptoms are usually delayed for 8 hours or longer. Gastrointestinal symptoms from smaller doses may

be delayed 24-48 hours. This is followed by neurological effects 2-5 days or even longer after ingestion, although it may occur as early as 12 hours after massive exposure. Other effects include hair loss, severe pain in the extremities, lethargy, ataxia, back pain, abnormal reflexes, neuropathy, muscle weakness, mental abnormalities, tremors, abnormal vision, headache, coma, convulsion, and death. There was no information available for exposure to thallium metal specifically rather than thallium compounds, and little conclusive information regarding exposure via inhalation.

Acute Toxicity: No data

Carcinogenicity: **NTP**: Not identified as carcinogenic **IARC**: Not identified as carcinogenic

To the best of our knowledge the chemical, physical and toxicological characteristics of the substance are not fully known.

12 ECOLOGICAL INFORMATION

Ecotoxicity: LC50 - Cyprinodon variegatus (sheepshead minnow) - 21.0 mg/l - 96.0 h

Persistence and Degradability: No data

Bioaccumulative Potential: No data

Mobility in Soil: No data

Other Adverse Effects: Do not allow material to be released to the environment. No further relevant information available.

13 DISPOSAL CONSIDERATIONS

Waste Disposal Method:

Product: Dispose of in accordance with Federal, State and Local regulations.

Packaging: Dispose of in accordance with Federal, State and Local regulations.

14 TRANSPORT INFORMATION

UN Number: UN3288

UN Proper Shipping Name: Toxic solid, inorganic, n.o.s. (Thallium)

Transport Hazard Class: 6.1

Packing Group: II

Marine Pollutant: Yes

15 REGULATORY INFORMATION

TSCA Listed: All components are listed.

Regulation (EC) No 1272/2008 (CLP): Acute toxicity - oral, category 2, Hazardous to the aquatic environment - acute hazard, category 3, Hazardous to the aquatic environment - chronic hazard, category 3.

Canada WHMIS Classification (CPR, SOR/88-66): Acute toxicity.

HMIS Ratings: **Health**: 3 **Flammability**: 0 **Physical**: 0

NFPA Ratings: **Health**: 3 **Flammability**: 0 **Instability**: 0

Chemical Safety Assessment: A chemical safety assessment has not been carried out.

16 OTHER INFORMATION

The information contained in this document is based on the state of our knowledge at the time of publication and is believed to be correct, but does not purport to be all inclusive and shall be used only as a guide. ESPI Metals makes no representation, warranty, or guarantee of any kind with respect to the information contained in this document or any use of the product based on this information. ESPI Metals shall not be held liable for any damages resulting from handling or from contact with the above product. Users should satisfy themselves that they have all current data relevant to their particular use.

Prepared by: ESPI Metals

Revised/Reviewed: July 2015

Safety Data Sheets (SDS)

SECTION 1-IDENTIFICATION

Product name: Toluene

Other names:-

Proper shipping name: Toluene

Recommended use of the chemical and restrictions on use:
The major use of toluene is as a mixture added to gasoline to improve octane ratings. Used as a solvent for paint, resins, lacquers inks & adhesives. Component of solvent blends and thinners. Used in the manufacture of chemicals, dyes, explosives, benzoic acid. Some grades of toluene may contain traces of xylene and benzene.
The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.
WARNING: Intentional misuse by concentrating/inhaling contents may be lethal.

Manufacturer/Supplier Name: Taiwan SM Corp., Kaohsiung plant
Address: NO.7, Industrial 1st Rd, Lin-Yuan Kaohsiung County 83203, Taiwan, R.O.C.
Phone No.: 886-7-6414511

Emergency phone No./Fax No.: 886-7-6414511 Ext. 221 (on duty), 886-7-6414517 (off duty)/886-7-6423828

SECTION 2-HAZARDS IDENTIFICATION

GHS Classification:

Flammable Liquid Category 2
Acute Toxicity (Oral) Category 4
Skin Corrosion/ Irritation Category 2
Serious Eye Damage/ Eye Irritation Category 2
Specific Target Organ Toxicity Repeated Exposure Category 2
Hazardous To The Aquatic Environment (Acute) Category 3
Aspiration Hazard Category 1

GHS Label elements:

Hazard symbols



Signal word

Danger

Hazard statements

Highly flammable liquid and vapor
Harmful if inhaled
Causes skin irritation
Causes serious eye irritation
May cause damage to organs through prolonged or repeated exposure.
May cause long lasting harmful effects to aquatic life.
May be fatal if swallowed and enters airways.

Precautionary statements

Use only in well ventilated area.
Control of exposure by mechanical ventilation in an unventilated or confined space.
Avoid breathing vapors and contact with skin and eyes.
Wear breathing apparatus/protective gloves/face protection.
Store in well-ventilated place.
Disposal must be in accordance with applicable federal, state, or local regulations.

Other hazards: —

SECTION 3-COMPOSITION/INFORMATION ON INGREDIENTS

CAS No.	Chemical Name	wt% by weight	EINECS No.
00108-88-3	Toluene	97.0 min.	203-625-9
Synonyms	**Methylbenzol; Methylbenzene; Toluol; Phenylmethane**		

SECTION 4-FIRST AID MEASURES

Description of necessary first aid measures

Eye:

1. Flush immediately with warm water for at least 20 minutes.
2. Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
3. If pain persists or recurs seek medical attention.
4. Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

Skin:

1. Removing contaminated clothing, shoes, and leathery wearings, cleaning procedure is available before reused or waste treatment.
2. Washing affected area thoroughly with soap and water for at least 20 minutes.
3. Call a Physician if irritation develops or persists.

Ingestion:

1. If spontaneous vomiting appears imminent or occurs, hold patient's head down, lower than their hips to help avoid possible aspiration of vomits.
2. If victim is conscious and alert, give 2～4 cupfuls of milk/water to dilute the substance in stomach.
3. Never give anything by mouth to an unconscious person.
4. Don't induce vomiting unless directed to do so by medical person.
5. If vomiting occurs, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration.
6. Then seek for medical attention.

Inhalation:

1. Remove from further exposure and flush thoroughly with air.
2. Lay patient down. Keep warm and rested.
3. Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
4. If respiratory irritation, seek immediate medical assistance and call a physician.

Most important symptoms/effects, acute and delayed

Headache, fatigue, drowsiness, insomnia, anorexia and pain in limbs, nervousness, impairment of memory.

Indication of immediate medical attention and special treatment needed, if necessary

For acute or short term repeated exposures to toluene:

Inhalation:

1. Inhalation overexposure can produce toxic effects. Monitor for respiratory distress.
2. If cough or difficulty in breathing develops, evaluate for upper respiratory tract inflammation, bronchitis, and pneumonitis. Administer supplemental oxygen with assisted ventilation, as required.
3. This material (or a component) sensitizes the heart to the effects of sympathomimetic amines. Epinephrine and other sympathomimetic drugs may initiate cardiac arrhythmias in individuals exposed to this material.
4. Administration of sympathomimetic drugs should be avoided.

Ingestion:

1. If ingested, this material presents a significant aspiration and chemical pneumonitis hazard.
2. Induction of emesis is not recommended.
3. Consider activated charcoal and/or gastric lavage.
4. If patient is obtunded, protect the airway by cuffed endotracheal intubation or by placement of the body in a Trendelenburg and left lateral decubitus position.

SECTION 5-FIRE FIGHTING MEASURES

Extinguishing media

Foam、CO_2、Dry chemical、Water fog.

Specific hazards arising from the chemical

1. Liquid and vapor are highly flammable.
2. Severe fire hazard when exposed to heat, flame and/or oxidizers.
3. Vapor may travel a considerable distance to source of ignition.
4. Heating may cause expansion or decomposition leading to violent rupture of containers.
5. On combustion, may emit toxic fumes of carbon monoxide (CO).

Special protective equipment and precautions for fire-fighters

1. Firefighters must use full bunker gear including NIOSH-approved positive pressure self-contained breathing apparatus to protect against potential hazardous combustion or decomposition products and oxygen deficiencies.
2. Evacuate area and fight the fire from a maximum distance or use unmanned hose holders or monitor nozzles.
3. Cover pooling liquid with foam.
4. Containers can build pressure if exposed to radiant heat; cool adjacent containers with flooding quantities of water until well after the fire is out.
5. Withdraw immediately from the area if there is a rising sound from a venting safety device or discoloration of vessels, tanks, or pipelines.
6. Be aware that burning liquid will float on water.
7. Notify appropriate authorities of potential fire and explosion hazard if liquid enter sewers or waterways

SECTION 6-ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedure

1. Personal protective equipment (specified in Section 8)
   Eyes : Chemical safety goggles are recommended, and a face shield is added when needed.
   Skin : Wear appropriate protective gloves to avoid skin contact.
   Clothing: When direct contact is likely, use rubberized clothings, apron and boots.
   Respiratory : When limits are exceeded, wear a respirator approved by NIOSH/MSHA for protection against organic dust, mists and vapors.
2. Remove all sources of ignition. No smoking, naked lights or ignition sources. Ventilate area of leak or spill.
3. Keep unnecessary and unprotected personnel from entering. Evacuate personnel from the danger area. Consult with an expert about the emergency procedures.

Environmental precautions

1. Prevent spillage from entering drains, surface, and groundwater.
2. Contain and recover liquid when possible. Use non-sparking tools and equipment.
3. Collect liquid in an appropriate container or absorb with an inert material (e.g. vermiculite, dry sand, earth), and place in a chemical waste container.
4. Report the accidental spill/release to Local/State government.

Methods and materials for containment and cleaning up

Minor spill:

1. Remove all ignition sources.
2. Clean up all spills immediately.
3. Avoid breathing vapors and contact with skin and eyes.
4. Control personal contact by using protective equipment.
5. Contain and absorb small quantities with vermiculite or other absorbent material.
6. Wipe up.
7. Collect residues in a flammable waste container.

Major spill

1. Clear area of personnel and move upwind.
2. Alert emergency responders and tell them location and nature of hazard.
3. May be violently or explosively reactive.
4. Wear breathing apparatus plus protective gloves.
5. Prevent spillage from entering drains or water course.
6. No smoking, naked lights or ignition sources. Increase ventilation.
7. Stop leak if safe to do so.
8. Water spray or fog may be used to disperse/absorb vapor.
9. Contain spill with sand, earth or vermiculite.
10. Use only spark-free shovels and explosion proof equipment.
11. Collect recoverable product into labeled containers for recycling..
12. Absorb remaining product with sand, earth or vermiculite.
13. Collect solid residues and seal in labeled drums for disposal.
14. Wash area and prevent runoff into drains.
15. If contamination of drains or waterways occurs, advise emergency services.

SECTION 7-HANDLING AND STORAGE

Precautions for safe handling

1. Wash thoroughly after handling.
2. Use only in well ventilated area.
3. Ground and bond containers when transferring.
4. Use spark-free tools and explosion proof equipment.
5. Empty containers retain product residue (liquid/vapor), and can be dangerous.
6. Do not pressurize, cut, weld, braze, solder, drill, or expose empty containers to heat, sparks or open flames.

Conditions for safe storage, including any incompatibilities

1. Store in original containers in approved flame-proof area.
2. No smoking, naked lights, heat or ignition sources.
3. DO NOT store in pits, depressions, basements or areas where vapors may be trapped.
4. Keep containers securely sealed.
5. Store away from incompatible materials in a cool, dry well ventilated area.
6. Protect containers against physical damage and check regularly for leaks.
7. Keep containers tightly closed and store in a cool, dry, well-ventilated place, plainly labeled, and out of closed vehicles.
8. Ground all equipment containing this material.
9. Observe manufacturer's storing and handling recommendations.
10. Containers should be able to withstand pressures expected from warming and cooling in storage. This flammable liquid should be stored in a separate safety cabinet or room. A refrigerated room is preferable for materials with a flash point temperature lower than 70°F (21°C).

SECTION 8-EXPOSURE CONTROLS, PERSONAL PROTECTION

OSHA - Final PELs : 200 ppm TWA.
OSHA Ceiling : 300ppm.
ACGIH : 50 ppm, skin -potential forcutaneous absorption.
NIOSH : 100 ppm TWA; 375 mg/m^3 TWA; 500 ppm IDLH.
Taiwan TWA : 100 ppm (skin).
Taiwan STEL : 125 ppm (skin).
Taiwan Ceiling : -------.
Taiwan BEI : 1 mg/l (before on duty).

Engineering control

1. Process should be located at least 17 meter (50 feet) away from open flames and all high temperature operations likely to cause ignition of the styrene monomer vapor.
2. In venting styrene monomer vapors, consideration should be given to possible halogenation of the vapors by low concentrations of free chlorine and bromine with the resultant formation of lacrimations.
3. Process should be designed so that the operator is not exposed to direct contact with Toluene or the vapor. The technical problems of designing equipment, providing adequate ventilation and operating procedures which promise maximum security and economy, can best be handled by competent engineers.
4. It is essential for safety that equipment be used and maintained as recommended by the manufacturer.
5. Tanks used to store or process Toluene should be closed vessels vented to a safe point of discharge in the outside atmosphere away from operating stations, roadways, and at least 17 meter (50 feet) from possible sources of ignitions. All sparks, flames, heated surface, or other sources of ignition should be kept away from all vents. It is advisable, to provide suction on vessels when inspection or observation openings are made, to minimize or eliminate escape of vapors.

Personal protective equipment

Eye Protection:
Safety glasses equipped with side shields are recommended as minimum protection in industrial settings. Chemical goggles should be worn during transfer operations or when there is a likelihood of misting, splashing, or spraying of this material. A suitable emergency eye wash water and safety shower should be located near the work station.

Skin protection:
Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact.

Clothing:
Avoid skin contact. Wear long-sleeved fire-retardant garments (e.g., Nomex®) while working with flammable and combustible liquids. Additional chemical-resistant protective gear may be required if splashing or spraying conditions exist. This may include an apron, boots and additional facial protection. If product comes in contact with clothing, immediately remove soaked clothing and shower. Promptly remove and discard contaminated leather goods.

Respirators:
For known vapor concentrations above the occupational exposure guidelines (see below), use a NIOSH-approved organic vapor respirator if adequate protection is provided. Protection factors vary depending upon the type of respirator used. Respirators should be used in accordance with OSHA requirements (29 CFR 1910.134). For airborne vapor concentrations that exceed the recommended protection factors for organic vapor respirators, use a full-face, positive-pressure, supplied air respirator. Due to fire and explosion hazards, do not enter atmospheres containing concentrations greater than 10% of the lower flammable limit of this product.

SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES

Appearance : Transparent liquid	Upper/lower explosive limits : 1.2%～7.1%
Odour : pleasant aromatic petroleum odour	Vapor Pressure : 22 mmHg @20℃/68℉
Odour threshold : 0.16～37 ppm (detect) 1.9～69 ppm (recognition)	Vapor Density : 3.1 (air=1)
PH : Not available	Relative density : 0.86 (water=1)
Melting/Freezing Point : －95 ℃	Solubility in water : 54～58 mg/100 ml
Initial boiling point/boiling range : 110.6 ℃	Partition coefficient : 2.73 (n-octanol/water)
Flash point : 4.4 ℃ (closed cup)	Auto-ignition temperature : 480℃
Evaporation Rate : 2.24 (BuAc=1)	Decomposition temperature : Not available
Flammability (solid/gas) : Not available	Viscosity : 0.6 mPa.s max @20℃
Molecular Formula : $C_6H_5CH_3$	Molecular Weight : 92.056

SECTION 10-STABILITY AND REACTIVITY

Reactivity
Vapor is explosive when exposed to heat or flame

Chemical stability
Stable at room temperature in closed containers under normal storage and handling conditions.

Possibility of hazardous reaction
Has not been reported.

Condition to avoid
Product is highly flammable – Keep away from sources of ignition. Avoid the higher temperatures. Keep away from open fire, heating elements and heat radiating surface and prevent from forming of the vapours mixtures with air in explosion limits.

Incompatible materials
Heat, flame, strong oxidizers, nitric and sulfuric acids, chlorine, nitrogen tetraoxide; will attack some forms of plastics, rubber, coatings.

Hazardous decomposition products
Carbon monoxide, carbon dioxide, hydrocarbons.

SECTION 11-TOXICOLOGICAL INFORMATION

Routes of exposure
Eye, Skin, inhalation, Ingestion.

Symptoms (treatments as indicated in Section 4)
Eye: The liquid produces a high level of eye discomfort and is capable of causing pain and severe conjunctivitis. Corneal injury may develop, with possible permanent impairment of vision, if not promptly and adequately treated. There is evidence that material may produce eye irritation in some persons and produce eye damage 24 hours or more after instillation. Severe inflammation may be expected with pain. There may be damage to the cornea. Unless treatment is prompt and adequate there may be permanent loss of vision. Conjunctivitis can occur following repeated exposure.

Skin: Contact with the material may damage the health of the individual; systemic effects may result following absorption. The material may cause moderate inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterized by redness, swelling and blistering. Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

Ingestion: Accidental ingestion of the material may be harmful; animal experiments indicate that ingestion of less than 150 gram may be fatal or may produce serious damage to the health of the individual. Swallowing of the liquid may cause aspiration into the lungs with the risk of chemical pneumonitis; serious consequences may result. (ICSC13733). Considered an unlikely route of entry in commercial/industrial environments. The liquid may produce gastrointestinal discomfort and may be harmful if swallowed. Ingestion may result in nausea, pain and vomiting. Vomit entering the lungs by aspiration may cause potentially lethal chemical pneumonitis.

Inhalation: Inhalation of vapours or aerosols (mists, fumes), generated by the material during the course of normal handling, may be damaging to the health of the individual. There is some evidence to suggest that the material can cause respiratory irritation in some persons. The body's response to such irritation can cause further lung damage. Inhalation of vapours may cause drowsiness and dizziness. This may be accompanied by sleepiness, reduced alertness, loss of reflexes, lack of co-ordination, and vertigo. Inhalation of high concentrations of gas/vapour causes lung irritation with coughing and nausea, central nervous depression with headache and dizziness, slowing of reflexes, fatigue and inco-ordination. If exposure to highly concentrated solvent atmosphere is prolonged this may lead to narcosis, unconsciousness, even coma and possible death. The use of a quantity of material in an unventilated or confined space may result in increased exposure and an irritating atmosphere developing. Before starting consider control of exposure by mechanical ventilation.

Chronic exposure: There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment. Substance accumulation, in the human body, may occur and may cause some concern following repeated or long-term occupational exposure.

Toxicity
LD50: <870 mg/kg (rat, oral)
LC50: 6000 ppm/6h (rat, inhalation)

Chronic effect
Carcinogenicity:
ACGIH : A4-Not classifiable as a Human Carcinogen.
OSHA : Possible select carcinogen.
IARC : Group 3 carcinogen.

Epide miology: Not available.

Teratogenicity: Teratogenic effects have occurred in experimental animals.

Reproductive Effects: Adverse reproductive effects have occurred in experimental animals.

Neurotoxicity: Not available.

Mutagenicity: Not available.

SECTION 12-ECOLOGICAL INFORMATION

Ecotoxicity
LC_{50} (96 hr.) Fish: 7.3～22.8 mg/l
EC_{50} (48 hr.) Water flea: —
Biocencentration factor (BCF): 1.67～380

Persistence and degradability
1. The material are expected to form a slick on the surface of waters after release in calm sea conditions. This is expected to evaporate and enter the atmosphere where it will be degraded through reaction with hydroxyl radicals.
2. Some of the material will become associated with benthic sediments, and it is likely to be spread over a fairly wide area of sea floor. Marine sediments may be either aerobic or anaerobic. The material, in probability, is biodegradable, under aerobic conditions. Evidence also suggests that the hydrocarbons may be degradable under anaerobic conditions although such degradation in benthic sediments may be a relatively slow process.
3. Under aerobic conditions the material will degrade to water and carbon dioxide, while under aerobic processes it will produce water, methane, carbon dioxide and carbon dioxide.
4. Based on test results, as well as theoretical considerations, the potential for bioaccumulation may be high. Toxic effects are often observed in species such as blue mussel, daphnia, freshwater green algae, marine copepods and amphipods.

Half-life (Air): 10～104 hr
Half-life (Surface water): 96～528 hr
Half-life (Ground water): 168～672 hr
Half-life (Soil): 96～528 hr

Bioaccumulative potential
This material is not expected to significantly bioaccumulate.

Mobility in soil: —

Other adverse effects: —

SECTION 13-DISPOSAL CONSIDERATIONS

Residues and spilled material are hazardous waste due to ignitability. Disposal must be in accordance with applicable federal, state, or local regulations.
The container for this product can present explosion or fire hazards, even when emptied. To avoid risk of injury, do not cut, puncture, or weld on or near this container. Since the emptied containers retain product residue, follow label warnings even after container is emptied.

SECTION 14-TRANSPORTATION INFORMATION

US DOT	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3		
	UN Number	1294		
	Packing Group	II		
Sea(IMO/IMDG)	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3.2		
	UN Number	1294		
	Packing Group	II		
	IMDG Code Page	3285		
	MARPOL	Not a DOT "Marine Pollutant" per 49 CFR 171.8.		
Air(ICAO/IATA)	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3.2		
	Subsidiary Class	1294		
	Packing Group	II		
RID/ ADR	No information available.			
Canadian TDG	Shipping Name	Toluene	Hazard Labels	
	Hazard Class	3		
	UN Number	1294		
	Packing Group	II		
	Subsidiary Class	9.2		

SECTION 15-REGULATORY INFORMATION

US FEDERAL

TSCA

CAS# 108-88-3 is listed on the TSCA inventory.

Health & Safety Reporting List

CAS# 108-88-3: Effective Date: 10/4/82; Sunset Date: 10/4/92

Chemical Test Rules

None of the chemicals in this product are under a Chemical Test Rule.

Section 12b

None of the chemicals are listed under TSCA Section 12b.

TSCA Significant New Use Rule

None of the chemicals in this material have a SNUR under TSCA.

SARA

Section 302 (RQ)

CAS# 108-88-3 : final RQ = 1000 pounds (454 kg)

Section 302 (TPQ)

None of the chemicals in this material have a TPQ.

SARA Codes

CAS# 108-88-3 : acute, flammable.

Section 313

This material contains Toluene (CAS# 108-88-3, 99% & 100%), which is subject to the reporting requirements of Section 313 of SARA Title III and 40 CFR Part 372.

Clean Air Act

CAS# 108-88-3 is listed as a hazardous air pollutant (HAP).

This material does not contain any Class 1 Ozone depletors.

This material does not contain any Class 2 Ozone depletors.

Clean Water Act

CAS# 108-88-3 is listed as a Hazardous Substance under the CWA.
CAS# 108-88-3 is listed as a Priority Pollutant under the Clean Water Act.
CAS# 108-88-3 is listed as a Toxic Pollutant under the Clean Water Act.

OSHA

None of the chemicals in this product are considered highly hazardous by OSHA.

STATE

Toluene can be found on the following state right to know lists: California, New Jersey, Florida, Pennsylvania, Minnesota, Massachusetts.

WARNING: This product contains Toluene, a chemical known to the state of California to cause birth defects or other reproductive harm.

California No Significant Risk Level: None of the chemicals in this product are listed.

European/International Regulations

European Labeling in Accordance with EC Directives

Hazard Symbols: XN F
Risk Phrases : R 10 Flammable.
R 20 Harmful by inhalation.
Safety Phrases : S 9 Keep container in a well-ventilated place.
S 16 Keep away from sources of ignition - No smoking.
S 25 Avoid contact with eyes.
S 29 Do not empty into drains.
S 33 Take precautionary measures against static discharges.

WGK (Water Danger/Protection)

CAS# 108-88-3: 2

United Kingdom Occupational Exposure Limits

CAS# 108-88-3: OES-United Kingdom, TWA 50 ppm TWA; 191 mg/m3 TWA.
CAS# 108-88-3: OES-United Kingdom, STEL 150 ppm STEL; 574 mg/m3 STEL.

CANADA

CAS#100-42-5 is listed on Canada's DSL/NDSL list.
This product has a WHMIS classification of B2, D2A (99%)/B3, D2A (100%).
CAS# 105-05-5 is not listed on Canada's Ingredient Disclosure List.

Exposure Limits

- CAS# 108-88-3: OEL-AUSTRALIA:TWA 100 ppm (375 mg/m3);STEL 150 ppm (560 mg/m3)
- OEL-BELGIUM:TWA 100 ppm (377 mg/m3);STEL 150 ppm (565 mg/m3)
- OEL-CZECHOSLOVAKIA:TWA 200 mg/m3;STEL 1000 mg/m3
- OEL-DENMARK:TWA 50 ppm (190 mg/m3);Skin
- OEL-FINLAND:TWA 100 ppm (375 mg/m3);STEL 150 ppm; Skin
- OEL-FRANCE:TWA 100 ppm (375 mg/m3);STEL 150 ppm (560 mg/m3)
- OEL-GERMANY:TWA 100 ppm (380 mg/m3)
- OEL-HUNGARY:TWA 100 mg/m3;STEL 300 mg/m3;Skin
- OEL-JAPAN:TWA 100 ppm (380 mg/m3)
- OEL-THE NETHERLANDS:TWA 100 ppm (375 mg/m3);Skin
- OEL-THE PHILIPPINES:TWA 100 ppm (375 mg/m3)
- OEL-POLAND:TWA 100 mg/m3
- OEL-RUSSIA:TWA 100 ppm; STEL 50 mg/m3
- OEL-SWEDEN:TWA 50 ppm (200 mg/m3);STEL 100 ppm (400 mg/m3);Skin
- OEL-SWITZERLAND:TWA 100 ppm (380 mg/m3);STEL 500 ppm
- OEL-THAILAND:TWA 200 ppm; STEL 300 ppm
- OEL-TURKEY:TWA 200 ppm (750 mg/m3)
- OEL-UNITED KINGDOM:TWA 100 ppm (375 mg/m3);STEL 150 ppm; Skin OEL IN BULGARIA, COLOMBIA, JORDAN, KOREA check ACGIH TLV OEL IN NEW ZEALAND, SINGAPORE, VIETNAM check ACGI TLV

SECTION 16-OTHER INFORMATION

References and sources

1. CHEMINFO Data Bank, CCINFO CD, 2005-3
2. HAZARD TEXT Data Bank, TOMES PLUS CD, Vol.65, 2005
3. RETECS Data Bank, TOMES CPS CD, Vol.65, 2005
4. HSDB Data Bank, TOMES CPS CD, Vol.65, 2005
5. Hazardous Substance Data Bank, Environment Protection, Administration, Executive Yuan, ROC (Taiwan)
6. Chemwatch Data Bank, 2005-1
7. SDS, GHS in Taiwan, Council of Labor Affairs, Executive Yuan, ROC (Taiwan)

Version	Date	Remark
Version 1	06/01/1998	Original Version.
Version 2	04/20/2001	Updated 10 sections to 16 sections.
Version 3	08/01/2003	Updated “SECTION 9-PHYSICAL AND CHEMICAL PROPERTIES”.
Version 4	01/01/2006	Updated “SECTION 14-TRANSPORTATION INFORMATION”.
Version 5	08/05/2008	Updated each section by GHS SDS.
Prepared by	Safety & Environment Protection Section, Taiwan SM Corporation Kaohsiung Plant.	

SAFETY DATA SHEET

Version 6.8
Revision Date 09/07/2024
Print Date 09/08/2024

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1 Product identifiers

Product name : PCB No 28

Product Number : 35601
Brand : Sigma-Aldrich
Index-No. : 602-039-00-4
CAS-No. : 7012-37-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

Uses advised against : The product is being supplied under the TSCA R&D Exemption (40 CFR Section 720.36). It is the recipient's responsibility to comply with the requirements of the R&D exemption. The product may not be used for a non-exempt commercial purpose under TSCA unless appropriate consent is granted in writing by MilliporeSigma.

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone : +1 314 771-5765
Fax : +1 800 325-5052

1.4 Emergency telephone

Emergency Phone # : 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)

Specific target organ toxicity - repeated exposure (Category 2), H373
Short-term (acute) aquatic hazard (Category 1), H400
Long-term (chronic) aquatic hazard (Category 1), H410

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For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal Word Warning

Hazard Statements

H373	May cause damage to organs through prolonged or repeated exposure.
H410	Very toxic to aquatic life with long lasting effects.

Precautionary Statements

P260	Do not breathe dust.
P273	Avoid release to the environment.
P314	Get medical advice/ attention if you feel unwell.
P391	Collect spillage.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms : 2,4,4'-Trichlorobiphenyl
2,4,4'-PCB

Formula : $C_{12}H_7Cl_3$
Molecular weight : 257.54 g/mol
CAS-No. : 7012-37-5
EC-No. : 230-293-2
Index-No. : 602-039-00-4

Component	Classification	Concentration
2,4,4'-Trichlorobiphenyl		
	STOT RE 2; Aquatic Acute 1; Aquatic Chronic 1; H373, H400, H410 Concentration limits: >= 0.005 %: STOT RE 2, H373; >= 0.005 %: STOT RE 2, H373; M-Factor - Aquatic Acute: 10 - Aquatic Chronic: 10	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

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SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Show this material safety data sheet to the doctor in attendance.

If inhaled
After inhalation: fresh air. Call in physician.

In case of skin contact
In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.

In case of eye contact
After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.

If swallowed
After swallowing: immediately make victim drink water (two glasses at most). Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Water Foam Carbon dioxide (CO2) Dry powder

Unsuitable extinguishing media
For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Hydrogen chloride gas
Combustible.
Development of hazardous combustion gases or vapours possible in the event of fire.

5.3 Advice for firefighters
Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.

5.4 Further information
Suppress (knock down) gases/vapors/mists with a water spray jet. Prevent fire extinguishing water from contaminating surface water or the ground water system.

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SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Advice for non-emergency personnel: Avoid inhalation of dusts. Avoid substance contact. Ensure adequate ventilation. Evacuate the danger area, observe emergency procedures, consult an expert.
For personal protection see section 8.

6.2 Environmental precautions

Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up

Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up dry. Dispose of properly. Clean up affected area. Avoid generation of dusts.

6.4 Reference to other sections

For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling
Work under hood. Do not inhale substance/mixture.

Hygiene measures
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Tightly closed. Dry.

Storage class
Storage class (TRGS 510): 11: Combustible Solids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

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Component	CAS-No.	Value	Control parameters	Basis
2,4,4'-Trichlorobiphenyl	7012-37-5	TWA	0.001 mg/m3	USA. NIOSH Recommended Exposure Limits
	Remarks	Potential Occupational Carcinogen		

8.2 Exposure controls

Appropriate engineering controls
Change contaminated clothing. Preventive skin protection recommended. Wash hands after working with substance.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU). Safety glasses

Skin protection
Handle with impervious gloves.

This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:KCL 741 Dermatril® L

Body Protection
protective clothing

Respiratory protection
Recommended Filter type: Filter type P2
The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer.
These measures have to be properly documented.
required when dusts are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Control of environmental exposure
Do not let product enter drains.

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SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: solid
b)	Odor	No data available
c)	Odor Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/ range: 56 °C (133 °F)
f)	Initial boiling point and boiling range	No data available
g)	Flash point	> 100.00 °C (> 212.00 °F)
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapor pressure	No data available
l)	Vapor density	No data available
m)	Density	No data available
	Relative density	No data available
n)	Water solubility	insoluble
o)	Partition coefficient: n-octanol/water	No data available
p)	Autoignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	none

9.2 Other safety information

No data available

The life science business of Merck KGaA, Darmstadt, Germany
operates as MilliporeSigma in the US and Canada

SECTION 10: Stability and reactivity

10.1 Reactivity
The following applies in general to flammable organic substances and mixtures: in correspondingly fine distribution, when whirled up a dust explosion potential may generally be assumed.

10.2 Chemical stability
The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions
Violent reactions possible with:
strong oxidising agents

10.4 Conditions to avoid
no information available

10.5 Incompatible materials
No data available

10.6 Hazardous decomposition products
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
Oral: No data available
Inhalation: No data available
Dermal: No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitization
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: 1 - Group 1: Carcinogenic to humans (2,4,4'-Trichlorobiphenyl)

NTP: No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

Reproductive toxicity
No data available

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Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
May cause damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

11.2 Additional Information

RTECS: DV8840000
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

SECTION 12: Ecological information

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - > 0.16 mg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - > 0.16 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

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SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

DOT (US)
UN number: 3432 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, solid
Reportable Quantity (RQ):
Marine pollutant: yes Poison Inhalation Hazard: No

IMDG
UN number: 3432 Class: 9 Packing group: II EMS-No: F-A, S-A
Proper shipping name: POLYCHLORINATED BIPHENYLS, SOLID
Marine pollutant : yes
Marine pollutant : yes

IATA
UN number: 3432 Class: 9 Packing group: II
Proper shipping name: Polychlorinated biphenyls, solid

SECTION 15: Regulatory information

CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : No SARA Hazards

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Massachusetts Right To Know
No components are subject to the Massachusetts Right to Know Act.

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Pennsylvania Right To Know

2,4,4'-Trichlorobiphenyl 7012-37-5

Maine Chemicals of High Concern

Product does not contain any listed chemicals

Vermont Chemicals of High Concern

Product does not contain any listed chemicals

Washington Chemicals of High Concern

Product does not contain any listed chemicals

California Prop. 65

WARNING: This product can expose you to chemicals including 2,4,4'-Trichlorobiphenyl, which is/are known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

The ingredients of this product are reported in the following inventories:

TSCA : Product contains substance(s) not listed on TSCA inventory.

TSCA list

No substances are subject to a Significant New Use Rule.

The following substance(s) is/are subject to TSCA 12(b) export notification requirements:
2,4,4'-Trichlorobiphenyl 7012-37-5

SECTION 16: Other information

Further information

The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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Version: 6.8 Revision Date: 09/07/2024 Print Date: 09/08/2024

The life science business of Merck KGaA, Darmstadt, Germany
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SAFETY DATA SHEET
Xylene

SECTION 1: Identification of the substance/mixture and of the company/undertaking

Date issued 11.11.2013

1.1. Product identifier

Product name	Xylene
Chemical name	Xylene
Synonyms	Xylol, dimethyl benzene, xylenol
REACH Reg No.	01-2119488216-32-0000
CAS no.	1330-20-7
EC no.	215-535-7
Index no.	601-022-00-9
Article no.	13000000

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/preparation For the preparation of paints and as a solvent. General purpose cleaner.

1.3. Details of the supplier of the safety data sheet

Manufacturer

Company name	Fred Holmberg & Co AB
Office address	Geijersgatan 8
Postal address	Box 60056
Postcode	S-216 10
City	Limhamn
Country	Sweden
Tel	+46 (0)40 15 79 20
Fax	+46 (0)40 16 22 95
E-mail	info@holmberg.se
Website	http://www.holmberg.se/en/

1.4. Emergency telephone number

Emergency telephone 112 (Europe)

SECTION 2: Hazards identification

2.1. Classification of substance or mixture

Classification according to 67/548/EEC or 1999/45/EC	Xi; R38 Xn; R20/21 R10
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Flam. Liq. 3; H226; Acute tox. 4; H312; Skin Irrit. 2; H315; Acute tox. 4; H332;

2.2. Label elements

Hazard Pictograms (CLP)



Signal word	Danger
Hazard statements	H226 Flammable liquid and vapour. H312 Harmful in contact with skin. H315 Causes skin irritation. H332 Harmful if inhaled.
Precautionary statements	P210 Keep away from heat/sparks/open flames/hot surfaces. – No smoking. P233 Keep container tightly closed. P243 Take precautionary measures against static discharge. P280 Wear protective gloves/protective clothing/eye protection/face protection. P301 + P310 IF SWALLOWED: Immediately call a POISON CENTER or doctor/physician. P303 + P361 + P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower. P331 Do NOT induce vomiting. P403 + P235 Store in a well-ventilated place. Keep cool.

2.3. Other hazards

Other hazards	Not known.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Substance	Identification	Classification	Contents
Xylene	CAS no.: 1330-20-7 EC no.: 215-535-7 Index no.: 601-022-00-9	R10 Xn; R20/21 Xi; R38 Flam. Liq. 3; H226 Acute tox. 4; H332 Acute tox. 4; H312 Skin Irrit. 2; H315 Note : C	75 - 90 %
Ethylbenzene	CAS no.: 100-41-4 EC no.: 202-849-4 Index no.: 601-023-00-4 Synonyms: Ethylbenzene	F; R11 Xn; R20 Flam. Liq. 2; H225 Acute tox. 4; H332	10 - 25 %

Column headings	CAS no. = Chemical Abstracts Service; EU (Einecs or Elincs number) = European inventory of Existing Commercial Chemical Substances; Ingredient name = Name as specified in the substance list (substances that are not included in the substance list must be translated, if possible). Contents given in; %, %wt/wt, %vol/wt, %vol/vol, mg/m3, ppb, ppm, weight%, vol%
HH/HF/HE	T+ = Very toxic, T = Toxic, C = Corrosive, Xn = Harmful, Xi = Irritating, E = Explosive, O = Oxidizing, F+ = Extremly flammable, F = Very flammable, N = Environmental hazard

SECTION 4: First aid measures

4.1. Description of first aid measures

Inhalation	Move the exposed person to fresh air at once. Get medical attention if any discomfort continues.
Skin contact	Remove contaminated clothes and rinse skin thoroughly with water.
Eye contact	Immediately flush with plenty of water for up to 15 minutes. Remove any contact lenses and open eyes wide apart. Get medical attention if any discomfort continues.
Ingestion	NEVER MAKE AN UNCONSCIOUS PERSON VOMIT OR DRINK FLUIDS! Do not induce vomiting. Rinse mouth with water. Get medical attention.

4.2. Most important symptoms and effects, both acute and delayed

Information for health personnel	Treat Symptomatically. Do not give victim anything to drink if he is

unconscious.

4.3. Indication of any immediate medical attention and special treatment needed

Specific details on antidotes	No recommendation given.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	Extinguish with alcohol-resistant foam, carbon dioxide, dry powder or water fog.

5.2. Special hazards arising from the substance or mixture

Fire and explosion hazards	Solvent vapours may form explosive mixtures with air.
Hazardous combustion products	Fire creates: Carbon monoxide (CO). Carbon dioxide (CO2).

5.3. Advice for firefighters

Fire fighting procedures	No specific fire fighting procedure given.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal protection measures	Ensure suitable personal protection (including respiratory protection) during removal of spillages in a confined area. Ventilate well. Stop leak if possible without risk. Avoid contact with skin and eyes. Do not breathe vapour.

6.2. Environmental precautions

Environmental precautionary measures	Avoid discharge into drains, water courses or onto the ground.

6.3. Methods and material for containment and cleaning up

Cleaning method	Dam and absorb spillages with sand, earth or other non-combustible material.

6.4. Reference to other sections

Other instructions	No recommendation given.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Handling	Keep away from heat, sparks and open flame. Take precautionary measures against static discharges. Mechanical ventilation may be required.

Protective Safety Measures

Advice on general occupational hygiene	Provide easy access to water supply and eye wash facilities.

7.2. Conditions for safe storage, including any incompatibilities

Storage	Keep away from heat, sparks and open flame. Ground container and transfer equipment to eliminate static electric sparks. Store in a cool and well-ventilated place.

7.3. Specific end use(s)

Specific use(s)	Not entered.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

DNEL / PNEC

Method of testing	Contents
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: Etylbenzen Value: 289 mg/kg/dag

DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 77 mg/kg/dag
DNEL	Group: Industrial Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 180 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 14,8 mg/kg/dag
DNEL	Group: Consumer Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 108 mg/kg/dag
DNEL	Group: Consumer Exposure route: Oral Exposure frequency: Long term (repeated) Critical Component: Etylbenzen Type of effect: Systemic effect Value: 1,6 mg/kg/dag
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: xylen Value: 442 mg/kg/dag
DNEL	Group: Industrial Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 221 mg/kg/dag
DNEL	Group: Industrial Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 3182 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Short term (acute) Critical Component: xylen Value: 260 mg/kg/dag
DNEL	Group: Consumer Exposure route: Inhalation Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect

	Value: 65,3 mg/kg/dag
DNEL	Group: Consumer Exposure route: Dermal Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 1872 mg/kg/dag
DNEL	Group: Consumer Exposure route: Oral Exposure frequency: Long term (repeated) Critical Component: xylen Type of effect: Systemic effect Value: 12,5 mg/kg/dag
Exposure guidelines	Country of origin: Sverige Limit value type: NGV 200 mg/m3 OEL Short Term Value: 450 mg/m3 Source: Nationella hygieniska gränsvärden, AFS 2005:17
Other Information	Ovanstående NGV resp. KTV gäller både xylen och etylbenzen

8.2. Exposure controls

Occupational exposure limits: Provide adequate ventilation. Observe Occupational Exposure Limits and minimise the risk of inhalation of vapours. Protective gloves and goggles are recommended. Provide eyewash, quick drench.

Safety signs



Respiratory protection

Respiratory protection: Respiratory protection must be used if air contamination exceeds acceptable level. Use respiratory equipment with gas filter, type A2.

Hand protection

Hand protection: Use protective gloves. Chemical resistant gloves required for prolonged or repeated contact. Gloves of nitrile rubber, PVA or Viton are recommended.

Eye / face protection

Eye protection: Use safety goggles or face shield in case of splash risk.

Skin protection

Skin protection (except hands): Wear appropriate clothing to prevent any possibility of skin contact.

Hygiene / Environmental

Specific hygiene measures: Wash hands after contact.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	Fluid.
Colour	Colourless.
Odour	Aromatic.
Comments, pH (as supplied)	Not relevant.
Melting point/melting range	Value: < -48 °C
Boiling point / boiling range	Value: 136-145 °C
Flash point	Value: 27 °C
Evaporation rate	Value: 13,5
Explosion limit	Value: 1-7,1 %
Vapour pressure	Value: 1 kPa Test temperature: 20 °C

Vapour density	Value: 3,7
Specific gravity	Value: 0,870 kg/m3 Test temperature: 20 °C
Solubility description	Soluble in: Organic solvents. Not soluble in water.
Partition coefficient: n-octanol/water	Value: 3,15
Spontaneous combustability	Value: > 432-530 °C
Viscosity	Value: < 0,90 mPas Method of testing: Kinematisk Test temperature: 25 °C

9.2. Other information

SECTION 10: Stability and reactivity

10.1. Reactivity

Reactivity: Heating may cause a fire.

10.2. Chemical stability

Stability: Stable under the prescribed storage conditions.

10.3. Possibility of hazardous reactions

Possibility of hazardous reactions: Not known.

10.4. Conditions to avoid

Conditions to avoid: Avoid heat, flames and other sources of ignition.

10.5. Incompatible materials

Materials to avoid: Avoid contact with oxidising agents (e.g. nitric acid, peroxides and chromates). Strong acids.

10.6. Hazardous decomposition products

Hazardous decomposition products: Fire creates: Carbon monoxide (CO). Carbon dioxide (CO_2).

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Toxicological Information:

Other toxicological data: Acute Toxicity (Oral LD50): mg/kg (oral rat) > 2000
Acute Toxicity (Inhalation LC50): mg/l (vapours) (4h) > 20
Acute Toxicity (Dermal LD50): mg/kg Rabbit > 2000

Toxicological data for substances

Potential acute effects

Inhalation	In high concentrations, vapours are narcotic and may cause headache, fatigue, dizziness and nausea. Icke klassificerad som aspirationstoxisk (Not classified as asp. tox.)
Skin contact	Prolonged or frequent contact may cause redness, itching, eczema and skin cracking. Defats the skin.
Eye contact	May irritate and cause redness and pain.
Ingestion	Ingestion of large amounts may cause unconsciousness. However, ingestion may cause nausea, headache, dizziness and intoxication. Ingestion may cause irritation of the gastrointestinal tract, vomiting and diarrhoea. May cause irritation to the mouth and throat.

Delayed effects / repeated exposure

Sensitisation	Not known.
Chronic effects	None known.

Carcinogenic, Mutagenic or Reprotoxic

Carcinogenicity	None.
Mutagenicity	Not known.
Teratogenic properties	Suspected of damaging the unborn child

Reproductive toxicity	Not known.

SECTION 12: Ecological information

12.1. Toxicity

Acute aquatic, fish	Value: 2 mg/l Method of testing: LC50 Fish, species: Roccus saxatilis Duration: 96h
Acute aquatic, algae	Value: > 3,2 mg/l Method of testing: IC50 Algae, species: Selenastrum Capricornum Duration: 72h
Acute aquatic, Daphnia	Value: 8,5 mg/l Method of testing: EC50 Daphnia, species: Daphnia magna Duration: 48h

12.2. Persistence and degradability

Persistence and degradability description	Lättnedbrytbar av biologiska organismer.
Chemical oxygen demand (COD)	Value: 5 Method of testing: COD
Biological oxygen demand (BOD)	Value: 0,55 Method of testing: BOD

12.3. Bioaccumulative potential

Bioaccumulative potential	Will not bio-accumulate.
Bioconcentration factor (BCF)	Value: 22 Method of testing: BCF

12.4. Mobility in soil

Mobility	The product is insoluble in water and will spread on the water surface.

12.5. Results of PBT and vPvB assessment

PBT assessment results	This substance is not classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects / Remarks	None known.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Specify the appropriate methods of disposal	Confirm disposal procedures with environmental engineer and local regulations. Absorb in vermiculite or dry sand and dispose of at a licenced hazardous waste collection point. Liquid components can be disposed of by incineration.
Product classified as hazardous waste	Yes
Packaging classified as hazardous waste	Yes

SECTION 14: Transport information

14.1. UN number

ADR	1307
RID	1307
IMDG	1307
ICAO/IATA	1307

14.2. UN proper shipping name

ADR	XYLENES

RID	XYLENES
IMDG	XYLENES
ICAO/IATA	XYLENES

14.3. Transport hazard class(es)

ADR	3
Hazard no.	30
RID	3
ADN	33
IMDG	3
ICAO/IATA	3

14.4. Packing group

ADR	III
RID	III
IMDG	III
ICAO/IATA	III

14.5. Environmental hazards

Comment	Not relevant.

14.6. Special precautions for user

EmS	F-E, S-D

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

SECTION 15: Regulatory information

EC no.	215-535-7

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Other Label Information	Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 with amendments.
Legislation and regulations	Dangerous Substance Directive 67/548/EEC. The Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (S.I 2009 No. 716). The List of Wastes (England) (Amendment) Regulations 2005. (SI 2005 No. 895). Avfallsförordningen (2011:927).

15.2. Chemical safety assessment

SECTION 16: Other information

Hazard symbol



R-phrases	R10 Flammable. R38 Irritating to skin. R20/22 Harmful by inhalation and if swallowed. R38 Irritating to skin.
S-phrases	S7 Keep container tightly closed. S16 Keep away from sources of ignition - No smoking.
Classification according to Regulation (EC) No 1272/2008 [CLP/GHS]	Flam. Liq. 3; H226; Acute tox. 4; H312; Skin Irrit. 2; H315;

	Acute tox. 4; H332;
List of relevant R-phrases (under headings 2 and 3).	R38 Irritating to skin. R11 Highly flammable. R10 Flammable. R20/21 Harmful by inhalation and in contact with skin. R20 Harmful by inhalation.
List of relevant H-phrases (Section 2 and 3).	H332 Harmful if inhaled. H312 Harmful in contact with skin. H225 Highly flammable liquid and vapour. H226 Flammable liquid and vapour. H315 Causes skin irritation.
Responsible for safety data sheet	Fred Holmberg & Co AB

SAFETY DATA SHEET

Version 4.10
Revision Date 05/27/2016
Print Date 01/23/2017

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : *trans*-1,2-Dichloroethene

Product Number : 48527
Brand : Supelco
Index-No. : 602-026-00-3

CAS-No. : 156-60-5

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H225 Highly flammable liquid and vapour.
H332 Harmful if inhaled.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P233 Keep container tightly closed.
P240 Ground/bond container and receiving equipment.
P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242 Use only non-sparking tools.

P243	Take precautionary measures against static discharge.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353	IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P235	Store in a well-ventilated place. Keep cool.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : *trans*-1,2-Dichloroethene
trans-1,2-Dichloroethylene
trans-Acetylene dichloride

Formula : $C_2H_2Cl_2$
Molecular weight : 96.94 g/mol
CAS-No. : 156-60-5
EC-No. : 205-860-2
Index-No. : 602-026-00-3

Hazardous components

Component	Classification	Concentration
trans-Dichloroethylene		
	Flam. Liq. 2; Acute Tox. 4; Aquatic Acute 3; Aquatic Chronic 3; H225, H332, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
No data available

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Recommended storage temperature 2 - 8 °C

Light sensitive. Air and moisture sensitive. Refrigerate before opening.
Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
trans-Dichloroethylene	156-60-5	TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment Eye irritation		

		TWA	200.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Eye irritation		
		TWA	200 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment Eye irritation		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: light yellow
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -50 °C (-58 °F) - lit.
f)	Initial boiling point and boiling range	48 °C (118 °F) - lit.
g)	Flash point	6.0 °C (42.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	Upper explosion limit: 12.8 %(V) Lower explosion limit: 9.7 %(V)

	explosive limits	
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	1.257 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Bases

10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Hydrogen chloride gas
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 1,235 mg/kg

LD50 Oral - Mouse - 2,122 mg/kg
Remarks: Behavioral:Altered sleep time (including change in righting reflex). Behavioral:Somnolence (general depressed activity). Behavioral:Ataxia.

LC50 Inhalation - Rat - 24100 ppm
Remarks: Behavioral:Somnolence (general depressed activity).

LD50 Dermal - Rabbit - > 5,000 mg/kg
Remarks: Prolonged skin contact may cause skin irritation and/or dermatitis. Nutritional and Gross Metabolic:Weight loss or decreased weight gain.

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: Not available

prolonged or repeated exposure can cause:, narcosis, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Kidney -

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 220.00 mg/l - 48 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment

PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product

Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging

Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)

UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG

UN number: 1150 Class: 3 Packing group: II EMS-No: F-E, S-D
Proper shipping name: 1,2-DICHLOROETHYLENE

IATA

UN number: 1150 Class: 3 Packing group: II
Proper shipping name: 1,2-Dichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components

No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components

This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards

Fire Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
trans-Dichloroethylene	156-60-5	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
trans-Dichloroethylene	156-60-5	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
trans-Dichloroethylene	156-60-5	1993-04-24

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Flam. Liq.	Flammable liquids
H225	Highly flammable liquid and vapour.
H332	Harmful if inhaled.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	3
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	3
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.10 Revision Date: 05/27/2016 Print Date: 01/23/2017

SAFETY DATA SHEET

Version 4.6
Revision Date 03/02/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichloroethylene

Product Number : 251402
Brand : Sigma-Aldrich
Index-No. : 602-027-00-9

CAS-No. : 79-01-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Skin irritation (Category 2), H315
Eye irritation (Category 2A), H319
Germ cell mutagenicity (Category 2), H341
Carcinogenicity (Category 1B), H350
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Acute aquatic toxicity (Category 3), H402
Chronic aquatic toxicity (Category 3), H412

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H315 Causes skin irritation.
H319 Causes serious eye irritation.
H336 May cause drowsiness or dizziness.
H341 Suspected of causing genetic defects.
H350 May cause cancer.
H412 Harmful to aquatic life with long lasting effects.

Precautionary statement(s)

P201	Obtain special instructions before use.
P202	Do not handle until all safety precautions have been read and understood.
P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P273	Avoid release to the environment.
P280	Wear eye protection/ face protection.
P280	Wear protective gloves.
P281	Use personal protective equipment as required.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313	IF exposed or concerned: Get medical advice/ attention.
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	TCE Trichloroethene
Formula	:	C_2HCl_3
Molecular weight	:	131.39 g/mol
CAS-No.	:	79-01-6
EC-No.	:	201-167-4
Index-No.	:	602-027-00-9

Hazardous components

Component	Classification	Concentration
Trichloroethylene Included in the Candidate List of Substances of Very High Concern (SVHC) according to Regulation (EC) No. 1907/2006 (REACH)		
	Skin Irrit. 2; Eye Irrit. 2A; Muta. 2; Carc. 1B; STOT SE 3; Aquatic Acute 3; Aquatic Chronic 3; H315, H319, H336, H341, H350, H412	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage.

Light sensitive. Handle and store under inert gas.
Storage class (TRGS 510): Non-combustible, acute toxic Cat.3 / toxic hazardous materials or hazardous materials causing chronic effects

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Trichloroethylene	79-01-6	TWA	10.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		STEL	25.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
		Central Nervous System impairment cognitive decrement Renal toxicity Substances for which there is a Biological Exposure Index or Indices (see BEI® section) Suspected human carcinogen		
		Potential Occupational Carcinogen See Appendix C See Appendix A		
		See Table Z-2		
		TWA	100.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		CEIL	200.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		
		Peak	300.000000 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-2
		Z37.19-1967		

Biological occupational exposure limits

Component	CAS-No.	Parameters	Value	Biological specimen	Basis
Trichloroethylene	79-01-6	Trichloroacetic acid	15.0000 mg/l	Urine	ACGIH - Biological Exposure Indices (BEI)
	Remarks	End of shift at end of workweek			
		Trichloroethanol	0.5000 mg/l	In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In blood	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			
		Trichloroethylene		In end-exhaled air	ACGIH - Biological Exposure Indices (BEI)
		End of shift at end of workweek			

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 480 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -84.8 °C (-120.6 °F) - lit.
f)	Initial boiling point and boiling range	86.7 °C (188.1 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower	Upper explosion limit: 10.5 %(V)

	flammability or explosive limits	Lower explosion limit: 8 %(V)
k)	Vapour pressure	81.3 hPa (61.0 mmHg) at 20.0 °C (68.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.463 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 2.29log Pow: 5
p)	Auto-ignition temperature	410.0 °C (770.0 °F)
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Oxidizing agents, Strong bases, Magnesium

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 4,920 mg/kg

LC50 Inhalation - Mouse - 4 h - 8450 ppm

LD50 Dermal - Rabbit - > 20,000 mg/kg

No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Severe skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
Laboratory experiments have shown mutagenic effects.
In vitro tests showed mutagenic effects

Carcinogenicity

This product is or contains a component that has been reported to be probably carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Trichloroethylene)
NTP:	Reasonably anticipated to be a human carcinogen (Trichloroethylene)
OSHA:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KX4550000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, Exposure to and/or consumption of alcohol may increase toxic effects., Gastrointestinal disturbance, Kidney injury may occur., narcosis
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Pimephales promelas (fathead minnow) - 41 mg/l - 96.0 h
	LOEC - other fish - 11 mg/l - 10.0 d
	NOEC - Oryzias latipes - 40 mg/l - 10.0 d
Toxicity to daphnia and other aquatic invertebrates	EC50 - Daphnia magna (Water flea) - 18.00 mg/l - 48 h
Toxicity to algae	IC50 - Pseudokirchneriella subcapitata (green algae) - 175.00 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
Does not bioaccumulate.

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Harmful to aquatic life with long lasting effects.

An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.

Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene
Reportable Quantity (RQ): 100 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1710 Class: 6.1 Packing group: III EMS-No: F-A, S-A
Proper shipping name: TRICHLOROETHYLENE

IATA
UN number: 1710 Class: 6.1 Packing group: III
Proper shipping name: Trichloroethylene

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Trichloroethylene	79-01-6	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer. Trichloroethylene	CAS-No. 79-01-6	Revision Date 2011-09-01
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.	CAS-No. 79-01-6	Revision Date 2011-09-01

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
Carc.	Carcinogenicity
Eye Irrit.	Eye irritation
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H336	May cause drowsiness or dizziness.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H402	Harmful to aquatic life.

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	2
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 03/02/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

Version 4.17
Revision Date 03/03/2015
Print Date 02/19/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Trichlorofluoromethane

Product Number : 254991
Brand : Aldrich

CAS-No. : 75-69-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Acute toxicity, Dermal (Category 4), H312

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Warning

Hazard statement(s)
H312 Harmful in contact with skin.

Precautionary statement(s)
P280 Wear protective gloves/ protective clothing.
P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER or doctor/ physician if you feel unwell.
P363 Wash contaminated clothing before reuse.
P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms : Fluorotrichloromethane
CFC-11

Formula	:	CCl_3F CCl_3F
Molecular weight	:	137.37 g/mol
CAS-No.	:	75-69-4
EC-No.	:	200-892-3

Hazardous components

Component	Classification	Concentration
Trichlorofluoromethane		
	Acute Tox. 4; H312	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides, Hydrogen chloride gas, Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Soak up with inert absorbent material and dispose of as hazardous waste. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling

Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature 2 - 8 °C

Contents under pressure.
Storage class (TRGS 510): Non Combustible Liquids

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Trichlorofluoromethane	75-69-4	C	1,000.000000 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Cardiac sensitization Not classifiable as a human carcinogen		
		C	1,000.000000 ppm 5,600.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		TWA	1,000.000000 ppm 5,600.000000 mg/m3	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		The value in mg/m3 is approximate.		

8.2 Exposure controls

Appropriate engineering controls

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection

Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection

Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.4 mm
Break through time: 480 min
Material tested:Camatril® (KCL 730 / Aldrich Z677442, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 30 min

Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: liquid, clear Colour: colourless
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	-110.99 - -109.99 °C (-167.78 - -165.98 °F)
f)	Initial boiling point and boiling range	23.7 °C (74.7 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	885.7 hPa (664.3 mmHg) at 20.0 °C (68.0 °F) 2,701.2 hPa (2,026.1 mmHg) at 55.0 °C (131.0 °F)
l)	Vapour density	No data available
m)	Relative density	1.494 g/cm3 at 25 °C (77 °F)
n)	Water solubility	1 g/l
o)	Partition coefficient: n-octanol/water	log Pow: 2.53
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available

t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 18.0 mN/m at 25.0 °C (77.0 °F)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong oxidizing agents, Sodium/sodium oxides, Potassium, Magnesium, Aluminum, Zinc

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - > 15,000 mg/kg

LC50 Inhalation - Rat - 0.3 h - 130000 ppm
Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: PB6125000

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated., Nausea, Dizziness, Headache, Vomiting, Diarrhoea, Abdominal pain, Weakness, Unconsciousness

Liver -

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 3082 Class: 9 Packing group: III
Proper shipping name: Environmentally hazardous substance, liquid, n.o.s. (Trichlorofluoromethane)
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

SARA 311/312 Hazards
Acute Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Trichlorofluoromethane	75-69-4	2007-07-01

California Prop. 65 Components

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Acute Tox.	Acute toxicity
H312	Harmful in contact with skin.

HMIS Rating

Health hazard:	1
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	1
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.17 Revision Date: 03/03/2015 Print Date: 02/19/2016

SAFETY DATA SHEET
CHROMIUM HARD,TRIVALENT

1. Identification

Product identifier

Product name CHROMIUM HARD,TRIVALENT

Product number 2403

Recommended use of the chemical and restrictions on use

Application Industrial Use

Details of the supplier of the safety data sheet

Supplier

SIFCO Applied Surface Concepts
5708 E. Schaaf Road
Independence, Ohio 44131
U.S.A.
Tel.: +1 216-524-0099
Fax: +1 216-524-6331
E-Mail: info@sifcoasc.com

Emergency telephone number

Emergency telephone CHEMTREC (United States) (800) 424-9300; CHEMTREC (International) +1 703-527-3887

2. Hazard(s) identification

Classification of the substance or mixture

Physical hazards Not Classified

Health hazards Skin Corr. 1B - H314 Eye Dam. 1 - H318 STOT SE 3 - H335

Environmental hazards Aquatic Acute 3 - H402

Label elements

Pictogram



Signal word Danger

Hazard statements H314 Causes severe skin burns and eye damage.
H335 May cause respiratory irritation.
H402 Harmful to aquatic life.

CHROMIUM HARD,TRIVALENT

Precautionary statements

P260 Do not breathe vapor/ spray.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
P304+P340 If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 If in eyes: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P363 Wash contaminated clothing before reuse.
P403+P233 Store in a well-ventilated place. Keep container tightly closed.
P501 Dispose of contents/ container in accordance with national regulations.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P284 [In case of inadequate ventilation] wear respiratory protection.
P301+P310 If swallowed: Immediately call a poison center/ doctor.
P302+P352 If on skin: Wash with plenty of water.

Contains AMMONIUM FORMATE, CHROMIUM (III) SULPHATE, AMMONIA ...%

Other hazards

This product does not contain any substances classified as PBT or vPvB.

3. Composition/information on ingredients

Mixtures

AMMONIUM FORMATE **25-30%**

CAS number: 540-69-2

Classification
Skin Irrit. 2 - H315
Eye Irrit. 2 - H319
STOT SE 3 - H335

AMMONIUM CHLORIDE **5-10%**

CAS number: 12125-02-9

Classification
Acute Tox. 4 - H302
Eye Irrit. 2 - H319

CHROMIUM (III) SULPHATE **5-10%**

CAS number: 10101-53-8

Classification
Acute Tox. 4 - H302
Acute Tox. 4 - H312
Acute Tox. 4 - H332
Skin Corr. 1B - H314
Eye Dam. 1 - H318
STOT SE 3 - H335

CHROMIUM HARD,TRIVALENT

Potassium Sulfate	**1-5%**
CAS number: 7778-80-5	
Classification Not Classified	

AMMONIA ...%	**1-5%**
CAS number: 1336-21-6 M factor (Acute) = 1	
Classification Skin Corr. 1B - H314 Eye Dam. 1 - H318 STOT SE 3 - H335 Aquatic Acute 1 - H400	

SODIUM BROMIDE	**<1%**
CAS number: 7647-15-6	
Classification Acute Tox. 4 - H312	

The full text for all hazard statements is displayed in Section 16.

4. First-aid measures

Description of first aid measures

Inhalation Move affected person to fresh air at once. Get medical attention.

Ingestion Get medical attention immediately. Do not induce vomiting.

Skin Contact Remove contaminated clothing immediately and wash skin with soap and water. Continue to rinse for at least 15 minutes and get medical attention.

Eye contact Remove affected person from source of contamination. Rinse immediately with plenty of water. Continue to rinse for at least 15 minutes and get medical attention.

Most important symptoms and effects, both acute and delayed

Inhalation Coughing, chest tightness, feeling of chest pressure.

Ingestion May cause chemical burns in mouth and throat. May cause stomach pain or vomiting.

Skin contact May cause serious chemical burns to the skin.

Eye contact Causes severe burns. May cause serious eye damage.

Indication of immediate medical attention and special treatment needed

Notes for the doctor No specific recommendations.

5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media The product is not flammable. Use fire-extinguishing media suitable for the surrounding fire.

Special hazards arising from the substance or mixture

CHROMIUM HARD,TRIVALENT

Specific hazards Corrosive gases or vapors.

Advice for firefighters

Protective actions during firefighting Wear positive-pressure self-contained breathing apparatus (SCBA) and appropriate protective clothing.

Special protective equipment for firefighters Use protective equipment appropriate for surrounding materials.

6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

Personal precautions Follow precautions for safe handling described in this safety data sheet. Avoid inhalation of vapors. Provide adequate general and local exhaust ventilation.

Environmental precautions

Environmental precautions Do not discharge into drains or watercourses or onto the ground. Inform the relevant authorities if environmental pollution occurs (sewers, waterways, soil or air).

Methods and material for containment and cleaning up

Methods for cleaning up Wear suitable protective equipment, including gloves, goggles/face shield, respirator, boots, clothing or apron, as appropriate. Flush contaminated area with plenty of water. Avoid the spillage or runoff entering drains, sewers or watercourses. Collect and dispose of spillage as indicated in Section 13. Wash thoroughly after dealing with a spillage.

Reference to other sections Wear protective clothing as described in Section 8 of this safety data sheet. See Section 11 for additional information on health hazards. See Section 12 for additional information on ecological hazards. For waste disposal, see Section 13.

7. Handling and storage

Precautions for safe handling

Usage precautions Avoid spilling. Avoid contact with skin and eyes. Avoid inhalation of vapors and spray/mists. Provide adequate general and local exhaust ventilation.

Conditions for safe storage, including any incompatibilities

Storage precautions Store in tightly-closed, original container in a dry, cool and well-ventilated place. Protect from freezing and direct sunlight.

Storage class Corrosive storage.

Specific end uses(s)

Specific end use(s) The identified uses for this product are detailed in Section 1.

8. Exposure controls/Personal protection

Exposure controls

Protective equipment



Appropriate engineering controls As this product contains ingredients with exposure limits, process enclosures, local exhaust ventilation or other engineering controls should be used to keep worker exposure below any statutory or recommended limits, if use generates dust, fumes, gas, vapor or mist.

Eye/face protection Tight-fitting safety glasses.

CHROMIUM HARD,TRIVALENT

Hand protection	It is recommended that chemical-resistant, impervious gloves are worn. Considering the data specified by the glove manufacturer, check during use that the gloves are retaining their protective properties and change them as soon as any deterioration is detected. It is recommended that gloves are made of the following material: Nitrile rubber.
Other skin and body protection	Appropriate footwear and additional protective clothing complying with an approved standard should be worn if a risk assessment indicates skin contamination is possible.
Hygiene measures	Do not eat, drink or smoke when using this product. Wash at the end of each work shift and before eating, smoking and using the toilet.
Respiratory protection	If ventilation is inadequate, suitable respiratory protection must be worn. Respiratory protection must be used if the airborne contamination exceeds the recommended occupational exposure limit.

9. Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Liquid.
Color	Dark. Blue.
Odor	Acidic.
pH	pH (concentrated solution): 6.0-7.0
Initial boiling point and range	100°C/212°F @
Relative density	1.150-1.180
Other information	Not available.

10. Stability and reactivity

Reactivity	There are no known reactivity hazards associated with this product.
Stability	Stable at normal ambient temperatures and when used as recommended.
Possibility of hazardous reactions	Under normal conditions of storage and use, no hazardous reactions will occur.
Conditions to avoid	Avoid excessive heat for prolonged periods of time.
Materials to avoid	None known.
Hazardous decomposition products	None at ambient temperatures.

11. Toxicological information

Information on toxicological effects

Acute toxicity - oral

ATE oral (mg/kg)	4,284.49

Acute toxicity - dermal

ATE dermal (mg/kg)	19,400.35

Acute toxicity - inhalation

ATE inhalation (vapours mg/l)	194.0

CHROMIUM HARD,TRIVALENT

Inhalation	Vapors irritate the respiratory system.
Ingestion	Causes severe burns. May cause chemical burns in mouth, esophagus and stomach.
Skin Contact	May cause serious chemical burns to the skin.
Eye contact	Causes serious eye damage. Immediate first aid is imperative.
Acute and chronic health hazards	May cause burns in mucous membranes, throat, esophagus and stomach.
Route of exposure	Ingestion Inhalation Skin and/or eye contact

Toxicological information on ingredients.

AMMONIUM FORMATE

Acute toxicity - oral	
Acute toxicity oral (LD_{50} mg/kg)	2,250.0
Species	Mouse
ATE oral (mg/kg)	2,250.0

CHROMIUM (III) SULPHATE

Acute toxicity - oral	
ATE oral (mg/kg)	500.0
Acute toxicity - dermal	
ATE dermal (mg/kg)	1,100.0
Acute toxicity - inhalation	
ATE inhalation (vapours mg/l)	11.0

Potassium Sulfate

Acute toxicity - oral	
Acute toxicity oral (LD_{50} mg/kg)	6,600.0
Species	Rat
ATE oral (mg/kg)	6,600.0

AMMONIA ...%

Acute toxicity - oral	
Acute toxicity oral (LD_{50} mg/kg)	350.0
Species	Rat

SODIUM BROMIDE

Acute toxicity - oral

Acute toxicity oral (LD_{50} mg/kg)	3,500.0
Species	Rat
ATE oral (mg/kg)	3,500.0

Acute toxicity - dermal

Acute toxicity dermal (LD_{50} mg/kg)	2,000.0
Species	Rabbit
ATE dermal (mg/kg)	2,000.0

12. Ecological information

Ecotoxicity The product contains a substance which may have hazardous effects on the environment.

Toxicity No data available.

Ecological information on ingredients.

Potassium Sulfate

Acute aquatic toxicity

Acute toxicity - fish LC_{50}, 96 hour: 680 mg/l, Pimephales promelas (Fat-head Minnow)

AMMONIA ...%

Acute aquatic toxicity

$LE(C)_{50}$	0.1 < L(E)C50 ≤ 1
M factor (Acute)	1
Acute toxicity - fish	LC_{50}, 96 hours: 0.53 mg/l, Freshwater fish LC_{50}, 96 hours: 0.75 -3.4 mg/l, Freshwater fish LC_{50}, 96 hours: 8.2 mg/l, Freshwater fish
Acute toxicity - aquatic invertebrates	EC_{50}, 48 hours: 0.66 mg/l, Daphnia magna

SODIUM BROMIDE

Acute aquatic toxicity

Acute toxicity - fish	NOEC, 96 hour: 7800 mg/l, Oryzias latipes (Red killifish) LC_{50}, 96 hour: 160,000 mg/l, Poecilia reticulata (Guppy)
Acute toxicity - aquatic invertebrates	NOEC, 48 hour: 7800 mg/l, Daphnia magna EC_{50}, 48 hours: 5800 mg/l, Daphnia magna

Persistence and degradability

Persistence and degradability No data available.

Bioaccumulative potential

Bio-Accumulative Potential The product does not contain any substances expected to be bioaccumulating.

Mobility in soil

Mobility The product is soluble in water.

CHROMIUM HARD,TRIVALENT

Other adverse effects

Other adverse effects Not determined.

13. Disposal considerations

Waste treatment methods

General information Disposal of this product, process solutions, residues and by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any local authority requirements.

Disposal methods Dispose of waste to licensed waste disposal site in accordance with the requirements of the local Waste Disposal Authority.

14. Transport information

General The product is not covered by international regulations on the transport of dangerous goods (IMDG, IATA, DOT).

UN Number

UN No. (International) Not applicable.

UN proper shipping name

Proper shipping name (International) Not applicable.

Proper shipping name (DOT) NOT RESTRICTED LIQUID

Transport hazard class(es)

Transport Labels (International) No transport warning sign required.

Packing group

Packing group (International) Not applicable.

Environmental hazards

Environmentally Hazardous Substance
No.

Special precautions for user

Not applicable.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code Not applicable.

15. Regulatory information

National regulations The customer is advised to check if there are specific local or national regulations specifically applicable to the chemicals contained in the product. The hazards statement for this product is in accordance with international regulations, always observing the most stringent requirements.

US Federal Regulations

SARA Section 302 Extremely Hazardous Substances Tier II Threshold Planning Quantities
Exempt.

CHROMIUM HARD,TRIVALENT

CERCLA/Superfund, Hazardous Substances/Reportable Quantities (EPA)

Ammonium Chloride
Final CERCLA RQ: 5,000 lbs
Chromium Sulphate
Final CERCLA RQ: 1,000 lbs

SARA Extremely Hazardous Substances EPCRA Reportable Quantities

Exempt.

SARA 313 Emission Reporting

Chromium Sulphate

CAA Accidental Release Prevention

HAP
Chromium Sulphate

SARA (311/312) Hazard Categories

Acute
Chronic

OSHA Highly Hazardous Chemicals

Exempt.

US State Regulations

California Proposition 65 Carcinogens and Reproductive Toxins

Chromium Sulphate

California Directors List of Hazardous Substances

Ammonium Chloride
Chromium Sulphate

Inventories

US - TSCA

All ingredients are present.

16. Other information

Classification abbreviations and acronyms	Acute Tox. = Acute toxicity Carc. = Carcinogenicity Eye Dam. = Serious eye damage Eye Irrit. = Eye irritation Flam. Liq. = Flammable liquid Muta. = Germ cell mutagenicity Resp. Sens. = Respiratory sensitisation Skin Corr. = Skin corrosion Skin Irrit. = Skin irritation Skin Sens. = Skin sensitisation STOT RE = Specific target organ toxicity-repeated exposure STOT SE = Specific target organ toxicity-single exposure
Revision date	8/10/2018
Revision	3

CHROMIUM HARD,TRIVALENT

Hazard statements in full	H302 Harmful if swallowed. H312 Harmful in contact with skin. H314 Causes severe skin burns and eye damage. H315 Causes skin irritation. H318 Causes serious eye damage. H319 Causes serious eye irritation. H332 Harmful if inhaled. H335 May cause respiratory irritation. H400 Very toxic to aquatic life. H402 Harmful to aquatic life.
NFPA - health hazard	Extremely hazardous, serious injury. (3)
NFPA - flammability hazard	Will not burn. (0)
NFPA - instability hazard	Normally stable. (0)

The Information in this data sheet is believed to be correct but neither we nor our employees or agents give any warranty or make any representation to the accuracy thereof and accept no liability for any loss, injury or damage which may result in it's use. The sole purpose of this data sheet is to provide guidance on the safe handling and use of the products to which it relates. It does not form part of any product specification nor part of any contract. It is not practical for the guidance and information in this data sheet to cover every conceivable application of a product and as we may not be aware of the use to which the products covered by this data sheet are to be put it remains the responsibility of the user to conduct it's own tests and to satisy itself as to the suitability of the product.

SAFETY DATA SHEET

Version 4.6
Revision Date 04/24/2015
Print Date 02/08/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Vanadium

Product Number : 262935
Brand : Aldrich

CAS-No. : 7440-62-2

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture.

2.2 GHS Label elements, including precautionary statements

Not a hazardous substance or mixture.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula : V
Molecular weight : 50.94 g/mol
CAS-No. : 7440-62-2
EC-No. : 231-171-1

Hazardous components

Component	Classification	Concentration
Vanadium		
		<= 100 %

4. FIRST AID MEASURES

4.1 Description of first aid measures

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Vanadium/vanadium oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
No special environmental precautions required.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Handle and store under inert gas. Keep in a dry place.
Storage class (TRGS 510): Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vanadium	7440-62-2	TWA	1.000000 mg/m3	USA. NIOSH Recommended Exposure Limits
		ST	3.000000 mg/m3	USA. NIOSH Recommended Exposure Limits

8.2 Exposure controls

Appropriate engineering controls
General industrial hygiene practice.

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
No special environmental precautions required.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing	Melting point/range: 1,890 °C (3,434 °F) - lit.

	point	
f)	Initial boiling point and boiling range	3,380 °C (6,116 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	10.67 hPa (8.00 mmHg) at 20 °C (68 °F)
l)	Vapour density	No data available
m)	Relative density	6.11 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
No data available

10.5 Incompatible materials
Strong acids, Strong oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

Carcinogenicity - Rat - Intramuscular
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Tumorigenic:Tumors at site or application.

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: YW1355000

metallic taste, greenish-black discoloration of the tongue, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vanadium	7440-62-2	2007-03-01

SARA 311/312 Hazards
No SARA Hazards

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vanadium	7440-62-2	2007-03-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vanadium	7440-62-2	2007-03-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vanadium	7440-62-2	2007-03-01

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

HMIS Rating

Health hazard:	0
Chronic Health Hazard:	
Flammability:	0
Physical Hazard	0

NFPA Rating

Health hazard:	0
Fire Hazard:	0
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.6 Revision Date: 04/24/2015 Print Date: 02/08/2016

SAFETY DATA SHEET

Version 3.11
Revision Date 12/01/2015
Print Date 02/18/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Vinyl chloride

Product Number : 387622
Brand : Aldrich
Index-No. : 602-023-00-7

CAS-No. : 75-01-4

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable gases (Category 1), H220
Gases under pressure (Liquefied gas), H280
Carcinogenicity (Category 1A), H350

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H350 May cause cancer.

Precautionary statement(s)
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P281 Use personal protective equipment as required.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P377	Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381	Eliminate all ignition sources if safe to do so.
P405	Store locked up.
P410 + P403	Protect from sunlight. Store in a well-ventilated place.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

May form explosive peroxides.

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Synonyms	:	Chloroethylene
Formula	:	C_2H_3Cl
Molecular weight	:	62.50 g/mol
CAS-No.	:	75-01-4
EC-No.	:	200-831-0
Index-No.	:	602-023-00-7

Hazardous components

Component	Classification	Concentration
Vinyl chloride		
	Flam. Gas 1; Press. Gas Liquefied gas; Carc. 1A; SA ; H220, H280, H350,	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice

Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled

If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact

Wash off with soap and plenty of water. Consult a physician.

In case of eye contact

Flush eyes with water as a precaution.

If swallowed

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media

Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture

Carbon oxides, Hydrogen chloride gas

5.3 Advice for firefighters

Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Clean up promptly by sweeping or vacuum.

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid inhalation of vapour or mist.
Use explosion-proof equipment.Keep away from sources of ignition - No smoking.Take measures to prevent the build up of electrostatic charge.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

Contents under pressure. Light sensitive.

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters

Component	CAS-No.	Value	Control parameters	Basis
Vinyl chloride	75-01-4	TWA	1 ppm	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 ppm	USA. ACGIH Threshold Limit Values (TLV)
	Remarks	Liver damage Lung cancer Confirmed human carcinogen		
		STEL	5 ppm	USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000
		TWA	1 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		STEL	5 ppm	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
		See 1910.1017		
		Potential Occupational Carcinogen See Appendix A		

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Splash contact
Material: Fluorinated rubber
Minimum layer thickness: 0.7 mm
Break through time: 120 min
Material tested:Vitoject® (KCL 890 / Aldrich Z677698, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type AXBEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: Liquefied gas
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: -153.8 °C (-244.8 °F) - lit.
f)	Initial boiling point and boiling range	-13.4 °C (7.9 °F) - lit.
g)	Flash point	-61.0 °C (-77.8 °F) - closed cup
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	No data available
j)	Upper/lower flammability or	Upper explosion limit: 33 %(V) Lower explosion limit: 3.6 %(V)

	explosive limits	
k)	Vapour pressure	No data available
l)	Vapour density	No data available
m)	Relative density	0.911 g/cm3 at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	No data available
p)	Auto-ignition temperature	No data available
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.
Contains the following stabiliser(s):
Hydroquinone (>=0 - <=0.0001 %)
Phenol (>=0 - <=0.01 %)

10.3 Possibility of hazardous reactions
No data available

10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

10.5 Incompatible materials
Chemically active metals, Copper

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

LC50 Inhalation - Rat - 0.3 h - 180000 ppm
Remarks: Behavioral:Tremor. Behavioral:Convulsions or effect on seizure threshold. Respiratory disorder

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Human carcinogen.

IARC:	1 - Group 1: Carcinogenic to humans (Vinyl chloride)
NTP:	Known to be human carcinogen (Vinyl chloride)
OSHA:	OSHA specifically regulated carcinogen (Vinyl chloride)

Reproductive toxicity
No data available

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: KU9625000

burning sensation, Cough, wheezing, laryngitis, Shortness of breath, Headache, Nausea, Vomiting, To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

Central nervous system -
Stomach - Irregularities - Based on Human Evidence (Phenol)
Liver - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects

No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
Reportable Quantity (RQ): 1 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1086 Class: 2.1 EMS-No: F-D, S-U
Proper shipping name: VINYL CHLORIDE, STABILIZED

IATA
UN number: 1086 Class: 2.1
Proper shipping name: Vinyl chloride, stabilized
IATA Passenger: Not permitted for transport

15. REGULATORY INFORMATION

SARA 302 Components
The following components are subject to reporting levels established by SARA Title III, Section 302:

	CAS-No.	Revision Date
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01
Phenol	108-95-2	2007-07-01
Hydroquinone	123-31-9	2007-07-01

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01
Phenol	108-95-2	2007-07-01

New Jersey Right To Know Components

	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-07-01

California Prop. 65 Components

WARNING! This product contains a chemical known to the State of California to cause cancer.	CAS-No.	Revision Date
Vinyl chloride	75-01-4	2007-09-28

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

	May displace oxygen and cause rapid suffocation.
Carc.	Carcinogenicity
Flam. Gas	Flammable gases
H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.
H350	May cause cancer.
Press. Gas	Gases under pressure
SA	Simple Asphyxiant

HMIS Rating

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	4
Physical Hazard	3

NFPA Rating

Health hazard:	2
Fire Hazard:	4
Reactivity Hazard:	0

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 3.11 Revision Date: 12/01/2015 Print Date: 02/18/2016

SAFETY DATA SHEET

Creation Date 22-Sep-2009 **Revision Date** 25-Apr-2019 **Revision Number** 6

1. Identification

Product Name **Vinylidene chloride, stabilized**

Cat No. : **AC172290000; AC172290010; AC172290025; AC172290250**

CAS-No 75-35-4
Synonyms 1,1-Dichloroethylene

Recommended Use Laboratory chemicals.
Uses advised against Food, drug, pesticide or biocidal product use.

Details of the supplier of the safety data sheet

Company

Fisher Scientific
One Reagent Lane
Fair Lawn, NJ 07410
Tel: (201) 796-7100

Acros Organics
One Reagent Lane
Fair Lawn, NJ 07410

Emergency Telephone Number
For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

2. Hazard(s) identification

Classification
This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

Flammable liquids	Category 1
Acute oral toxicity	Category 4
Acute Inhalation Toxicity - Vapors	Category 4
Serious Eye Damage/Eye Irritation	Category 2
Carcinogenicity	Category 2
Specific target organ toxicity - (repeated exposure)	Category 2
Target Organs - Nasal Cavities, Liver.	

Label Elements

Signal Word
Danger

Hazard Statements
Extremely flammable liquid and vapor
Causes serious eye irritation

Suspected of causing cancer
May cause damage to organs through prolonged or repeated exposure
Harmful if swallowed or if inhaled



Precautionary Statements
Prevention
Obtain special instructions before use
Do not handle until all safety precautions have been read and understood
Use personal protective equipment as required
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Use only outdoors or in a well-ventilated area
Wear eye/face protection
Do not breathe dust/fume/gas/mist/vapors/spray
Keep away from heat/sparks/open flames/hot surfaces. - No smoking
Keep container tightly closed
Ground/bond container and receiving equipment
Use explosion-proof electrical/ventilating/lighting/equipment
Use only non-sparking tools
Take precautionary measures against static discharge
Response
IF exposed or concerned: Get medical attention/advice
Inhalation
IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
Skin
IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
Eyes
IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
If eye irritation persists: Get medical advice/attention
Ingestion
IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
Rinse mouth
Fire
In case of fire: Use CO2, dry chemical, or foam for extinction
Storage
Store locked up
Store in a well-ventilated place. Keep cool
Disposal
Dispose of contents/container to an approved waste disposal plant
Hazards not otherwise classified (HNOC)
Toxic to aquatic life with long lasting effects
WARNING. Cancer - https://www.p65warnings.ca.gov/.

3. Composition/Information on Ingredients

Component	CAS-No	Weight %
Vinylidene chloride	75-35-4	>95
4-Methoxyphenol	150-76-5	0.02

4. First-aid measures

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention.

Skin Contact Wash off immediately with plenty of water for at least 15 minutes. Get medical attention.

Inhalation Remove to fresh air. If breathing is difficult, give oxygen. Get medical attention.

Ingestion Do NOT induce vomiting. Get medical attention.

Most important symptoms and effects Difficulty in breathing. . Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Notes to Physician Treat symptomatically

5. Fire-fighting measures

Suitable Extinguishing Media Water spray. Carbon dioxide (CO_2). Dry chemical. Water mist may be used to cool closed containers. Chemical foam. Water mist may be used to cool closed containers.

Unsuitable Extinguishing Media No information available

Flash Point -25 °C / -13 °F

Method - No information available

Autoignition Temperature 520 °C / 968 °F

Explosion Limits

Upper	16.5%
Lower	8.4%
Sensitivity to Mechanical Impact	No information available
Sensitivity to Static Discharge	No information available

Specific Hazards Arising from the Chemical
Extremely flammable. Vapors may travel to source of ignition and flash back. Vapors may form explosive mixture with air. Containers may explode when heated. Vapors may form explosive mixtures with air.

Hazardous Combustion Products
Carbon monoxide (CO). Carbon dioxide (CO_2). Formaldehyde. peroxides. Hydrogen chloride gas.

Protective Equipment and Precautions for Firefighters
Vapors are heavier than air and may spread along floors. As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear.

NFPA

Health	Flammability	Instability	Physical hazards
2	4	1	N/A

6. Accidental release measures

Personal Precautions Remove all sources of ignition. Take precautionary measures against static discharges.

Environmental Precautions Do not flush into surface water or sanitary sewer system. See Section 12 for additional Ecological Information. Avoid release to the environment. Collect spillage.

Methods for Containment and Clean Up Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal. Remove all sources of ignition. Use spark-proof tools and explosion-proof equipment. Do not let this chemical enter the environment.

7. Handling and storage

Handling

Ensure adequate ventilation. Wear personal protective equipment/face protection. Avoid contact with skin and eyes. Take precautionary measures against static discharges. Do not ingest. If swallowed then seek immediate medical assistance. Handle product only in closed system or provide appropriate exhaust ventilation. Use spark-proof tools and explosion-proof equipment. Use only non-sparking tools. Do not subject to grinding/shock/friction. Avoid breathing dust/fume/gas/mist/vapors/spray. Keep away from open flames, hot surfaces and sources of ignition. To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.

Storage

Refrigerator/flammables. Keep away from heat, sparks and flame. Protect from light. May form explosive peroxides on prolonged storage. Keep under nitrogen. Keep containers tightly closed in a dry, cool and well-ventilated place.

8. Exposure controls / personal protection

Exposure Guidelines

Component	ACGIH TLV	OSHA PEL	NIOSH IDLH	Mexico OEL (TWA)
Vinylidene chloride	TWA: 5 ppm	(Vacated) TWA: 1 ppm (Vacated) TWA: 4 mg/m³		TWA: 5 ppm
4-Methoxyphenol	TWA: 5 mg/m³	(Vacated) TWA: 5 mg/m³	TWA: 5 mg/m³	TWA: 5 mg/m³

Legend

ACGIH - American Conference of Governmental Industrial Hygienists
OSHA - Occupational Safety and Health Administration
NIOSH IDLH: NIOSH - National Institute for Occupational Safety and Health

Engineering Measures

Use explosion-proof electrical/ventilating/lighting/equipment. Ensure adequate ventilation, especially in confined areas. Ensure that eyewash stations and safety showers are close to the workstation location.

Personal Protective Equipment

Eye/face Protection

Wear appropriate protective eyeglasses or chemical safety goggles as described by OSHA's eye and face protection regulations in 29 CFR 1910.133 or European Standard EN166.

Skin and body protection

Wear appropriate protective gloves and clothing to prevent skin exposure.

Respiratory Protection

Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced.

Hygiene Measures

Handle in accordance with good industrial hygiene and safety practice.

9. Physical and chemical properties

Physical State	Liquid
Appearance	Colorless
Odor	aromatic
Odor Threshold	No information available
pH	7 2.5 g/l aq.sol
Melting Point/Range	-122 °C / -187.6 °F
Boiling Point/Range	31.2 - 32 °C / 88.2 - 89.6 °F @ 760 mmHg
Flash Point	-25 °C / -13 °F
Evaporation Rate	No information available
Flammability (solid,gas)	Not applicable
Flammability or explosive limits	

Upper	16.5%
Lower	8.4%
Vapor Pressure	665 mbar @ 20 °C
Vapor Density	3.4 (Air = 1.0)
Specific Gravity	1.218
Solubility	No information available
Partition coefficient; n-octanol/water	No data available
Autoignition Temperature	520 °C / 968 °F
Decomposition Temperature	No information available
Viscosity	.377 mPa.s at 15 °C
Molecular Formula	C2 H2 Cl2
Molecular Weight	96.94

10. Stability and reactivity

Reactive Hazard None known, based on information available

Stability May form explosive peroxides. Hazardous polymerization may occur upon depletion of inhibitor. Moisture sensitive. Air sensitive. Light sensitive.

Conditions to Avoid Keep away from open flames, hot surfaces and sources of ignition. Excess heat. Exposure to air. Exposure to light. Incompatible products. Exposure to moist air or water.

Incompatible Materials Strong oxidizing agents, Strong bases, Finely powdered metals, oxygen, Peroxides, Metals, copper, Finely powdered metals, Acids

Hazardous Decomposition Products Carbon monoxide (CO), Carbon dioxide (CO_2), Formaldehyde, peroxides, Hydrogen chloride gas

Hazardous Polymerization Hazardous polymerization may occur.

Hazardous Reactions None under normal processing.

11. Toxicological information

Acute Toxicity

Product Information

Oral LD50 Category 4. ATE = 300 - 2000 mg/kg.

Vapor LC50 Category 4. ATE = 10 - 20 mg/l.

Component Information

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Vinylidene chloride	LD50 = 1500 mg/kg (Rat) LD50 = 200 mg/kg (Rat)	Not listed	LC50 = 1.66 mg/L (Rat) 4 h LC50 = 6350 ppm (Rat) 4 h
4-Methoxyphenol	1600 mg/kg (Rat)	LD50 > 2000 mg/kg (Rabbit)	Not listed

Toxicologically Synergistic Products No information available

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Irritation May cause skin, eye, and respiratory tract irritation

Sensitization No information available

Carcinogenicity Limited evidence of a carcinogenic effect. The table below indicates whether each agency has listed any ingredient as a carcinogen.

Component	CAS-No	IARC	NTP	ACGIH	OSHA	Mexico
Vinylidene chloride	75-35-4	Group 2B	Not listed	Not listed	X	Not listed
4-Methoxyphenol	150-76-5	Not listed	Not listed	Not listed	Not listed	Not listed

Mutagenic Effects Ames test: positive.

Reproductive Effects No information available.

Developmental Effects No information available.

Teratogenicity No information available.

STOT - single exposure None known
STOT - repeated exposure Nasal Cavities Liver

Aspiration hazard No information available

Symptoms / effects,both acute and delayed Inhalation of high vapor concentrations may cause symptoms like headache, dizziness, tiredness, nausea and vomiting

Endocrine Disruptor Information No information available

Other Adverse Effects The toxicological properties have not been fully investigated. See actual entry in RTECS for complete information.

12. Ecological information

Ecotoxicity

The product contains following substances which are hazardous for the environment. Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Vinylidene chloride	Not listed	LC50: 161 - 179 mg/L, 96h static (Pimephales promelas) LC50: 57 - 91 mg/L, 96h static (Lepomis macrochirus) LC50: 85 - 117 mg/L, 96h flow-through (Pimephales promelas)	EC50 > 2000 mg/L 17 h	LC50: 62 - 110 mg/L, 48h Static (Daphnia magna) LC50: 9.0 - 14.0 mg/L, 48h Static (Daphnia magna)
4-Methoxyphenol	Not listed	LC50: = 28.5 mg/L, 96h flow-through (Oncorhynchus mykiss) LC50: = 84.3 mg/L, 96h flow-through (Pimephales promelas)	EC50 = 3.66 mg/L 5 min EC50 = 4.30 mg/L 15 min EC50 = 4.61 mg/L 30 min	Not listed

Persistence and Degradability No information available

Bioaccumulation/ Accumulation No information available.

Mobility Will likely be mobile in the environment due to its volatility.

Component	log Pow
Vinylidene chloride	2.02
4-Methoxyphenol	1.3

13. Disposal considerations

Waste Disposal Methods Chemical waste generators must determine whether a discarded chemical is classified as a hazardous waste. Chemical waste generators must also consult local, regional, and national hazardous waste regulations to ensure complete and accurate classification.

Component	RCRA - U Series Wastes	RCRA - P Series Wastes
Vinylidene chloride - 75-35-4	U078	-

14. Transport information

DOT

UN-No	UN1303
Proper Shipping Name	VINYLIDENE CHLORIDE, STABILIZED
Hazard Class	3
Packing Group	I

TDG

UN-No	UN1303
Proper Shipping Name	VINYLIDENE CHLORIDE, STABILIZED
Hazard Class	3
Packing Group	I

IATA

UN-No	UN1303
Proper Shipping Name	VINYLIDENE CHLORIDE, STABILIZED
Hazard Class	3
Packing Group	I

IMDG/IMO

UN-No	UN1303
Proper Shipping Name	VINYLIDENE CHLORIDE, STABILIZED
Hazard Class	3
Subsidiary Hazard Class	P
Packing Group	I

15. Regulatory information

United States of America Inventory

Component	CAS-No	TSCA	TSCA Inventory notification - Active/Inactive	TSCA - EPA Regulatory Flags
Vinylidene chloride	75-35-4	X	ACTIVE	-
4-Methoxyphenol	150-76-5	X	ACTIVE	-

Legend:
TSCA - Toxic Substances Control Act, (40 CFR Part 710)
X - Listed
'-' - Not Listed

TSCA 12(b) - Notices of Export Not applicable

International Inventories
Canada (DSL/NDSL), Europe (EINECS/ELINCS/NLP), Philippines (PICCS), Japan (ENCS), Australia (AICS), China (IECSC), Korea (ECL).

Component	CAS-No	DSL	NDSL	EINECS	PICCS	ENCS	AICS	IECSC	KECL
Vinylidene chloride	75-35-4	X	-	200-864-0	X	X	X	X	KE-10122
4-Methoxyphenol	150-76-5	X	-	205-769-8	X	X	X	X	KE-23353

U.S. Federal Regulations

SARA 313

Component	CAS-No	Weight %	SARA 313 - Threshold Values %
Vinylidene chloride	75-35-4	>95	1.0

SARA 311/312 Hazard Categories See section 2 for more information

CWA (Clean Water Act)

Component	CWA - Hazardous Substances	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants
Vinylidene chloride	X	100 lb	X	X

Clean Air Act

Component	HAPS Data	Class 1 Ozone Depletors	Class 2 Ozone Depletors
Vinylidene chloride	X		-

OSHA - Occupational Safety and Health Administration: Not applicable

CERCLA: This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Component	Hazardous Substances RQs	CERCLA EHS RQs
Vinylidene chloride	100 lb 1 lb	-

California Proposition 65: This product contains the following Proposition 65 chemicals.

Component	CAS-No	California Prop. 65	Prop 65 NSRL	Category
Vinylidene chloride	75-35-4	Carcinogen	0.88 µg/day	Carcinogen

U.S. State Right-to-Know Regulations

Component	Massachusetts	New Jersey	Pennsylvania	Illinois	Rhode Island
Vinylidene chloride	X	X	X	X	X
4-Methoxyphenol	X	X	X	-	X

U.S. Department of Transportation

Reportable Quantity (RQ): N
DOT Marine Pollutant N
DOT Severe Marine Pollutant N

U.S. Department of Homeland Security: This product contains the following DHS chemicals:
Legend - STQs = Screening Threshold Quantities, APA = A placarded amount

Component	DHS Chemical Facility Anti-Terrorism Standard
Vinylidene chloride	Release STQs - 10000lb

Other International Regulations

Mexico - Grade: No information available

16. Other information

Prepared By
Regulatory Affairs
Thermo Fisher Scientific
Email: EMSDS.RA@thermofisher.com

Creation Date 22-Sep-2009
Revision Date 25-Apr-2019
Print Date 25-Apr-2019
Revision Summary This document has been updated to comply with the US OSHA HazCom 2012 Standard replacing the current legislation under 29 CFR 1910.1200 to align with the Globally Harmonized System of Classification and Labeling of Chemicals (GHS).

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text

End of SDS

SAFETY DATA SHEET

Version 4.9
Revision Date 08/24/2015
Print Date 02/07/2016

1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers

Product name : Zinc

Product Number : 324930
Brand : Aldrich
Index-No. : 030-001-00-1

CAS-No. : 7440-66-6

1.2 Relevant identified uses of the substance or mixture and uses advised against

Identified uses : Laboratory chemicals, Synthesis of substances

1.3 Details of the supplier of the safety data sheet

Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number

Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Self-heating substances and mixtures (Category 1), H251
Substances and mixtures, which in contact with water, emit flammable gases (Category 1), H260
Acute aquatic toxicity (Category 1), H400
Chronic aquatic toxicity (Category 1), H410

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram



Signal word Danger

Hazard statement(s)
H251 Self-heating: may catch fire.
H260 In contact with water releases flammable gases which may ignite spontaneously.
H410 Very toxic to aquatic life with long lasting effects.

Precautionary statement(s)
P223 Do not allow contact with water.
P231 + P232 Handle under inert gas. Protect from moisture.
P235 + P410 Keep cool. Protect from sunlight.
P273 Avoid release to the environment.

P280	Wear protective gloves/ eye protection/ face protection.
P335 + P334	Brush off loose particles from skin. Immerse in cool water/ wrap in wet bandages.
P370 + P378	In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.
P391	Collect spillage.
P402 + P404	Store in a dry place. Store in a closed container.
P407	Maintain air gap between stacks/ pallets.
P413	Store bulk masses greater than .? kg/ .? lbs at temperatures not exceeding .? °C/ .? °F.
P420	Store away from other materials.
P501	Dispose of contents/ container to an approved waste disposal plant.

2.3 Hazards not otherwise classified (HNOC) or not covered by GHS

Combustible dust

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances

Formula	:	Zn
Molecular weight	:	65.39 g/mol
CAS-No.	:	7440-66-6
EC-No.	:	231-175-3
Index-No.	:	030-001-00-1

Hazardous components

Component	Classification	Concentration
Zinc powder (pyrophoric)		
	Self-heat. 1; Water-react. 1; Aquatic Acute 1; Aquatic Chronic 1; H251, H260, H410	<= 100 %

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1 Description of first aid measures

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media

Suitable extinguishing media
Dry powder

5.2 Special hazards arising from the substance or mixture
Zinc/zinc oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas.
For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Do not flush with water. Keep in suitable, closed containers for disposal. Contain spillage, pick up with an electrically protected vacuum cleaner or by wet-brushing and transfer to a container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Further processing of solid materials may result in the formation of combustible dusts. The potential for combustible dust formation should be taken into consideration before additional processing occurs.
Provide appropriate exhaust ventilation at places where dust is formed.Keep away from sources of ignition - No smoking.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.
Never allow product to get in contact with water during storage.

Keep in a dry place.
Storage class (TRGS 510): Pyrophoric and self-heating hazardous materials

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

Components with workplace control parameters
Contains no substances with occupational exposure limit values.

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Protective gloves against thermal risks

Full contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: 480 min
Material tested:Dermatril® (KCL 740 / Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Body Protection
Flame retardant protective clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Control of environmental exposure
Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Discharge into the environment must be avoided.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on basic physical and chemical properties

a)	Appearance	Form: powder Colour: grey
b)	Odour	No data available
c)	Odour Threshold	No data available
d)	pH	No data available
e)	Melting point/freezing point	Melting point/range: 420 °C (788 °F) - lit.
f)	Initial boiling point and boiling range	907 °C (1,665 °F) - lit.
g)	Flash point	No data available
h)	Evaporation rate	No data available
i)	Flammability (solid, gas)	May form combustible dust concentrations in air
j)	Upper/lower flammability or explosive limits	No data available
k)	Vapour pressure	1 hPa (1 mmHg) at 487 °C (909 °F)

l)	Vapour density	No data available
m)	Relative density	7.133 g/mL at 25 °C (77 °F)
n)	Water solubility	No data available
o)	Partition coefficient: n-octanol/water	log Pow: 5
p)	Auto-ignition temperature	The substance or mixture is classified as self heating with the category 1.
q)	Decomposition temperature	No data available
r)	Viscosity	No data available
s)	Explosive properties	No data available
t)	Oxidizing properties	No data available

9.2 Other safety information
No data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Reacts violently with water.

10.4 Conditions to avoid
Exposure to moisture

10.5 Incompatible materials
Strong acids and oxidizing agents

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
No data available

Inhalation: No data available

Dermal: No data available

No data available

Skin corrosion/irritation
No data available

Serious eye damage/eye irritation
No data available

Respiratory or skin sensitisation
Did not cause sensitisation on laboratory animals.

Germ cell mutagenicity
No data available

Carcinogenicity

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as

probable, possible or confirmed human carcinogen by IARC.

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
No data available

No data available

Specific target organ toxicity - single exposure
No data available

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: ZG8600000

chills, dry throat, sweet taste, Fever, Cough, Nausea, Vomiting, Weakness
To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

12. ECOLOGICAL INFORMATION

12.1 Toxicity

Toxicity to fish	LC50 - Cyprinus carpio (Carp) - 450.0 µg/l - 96.0 h
Toxicity to daphnia and other aquatic invertebrates	LC50 - Daphnia magna (Water flea) - 0.068 mg/l - 48 h
	mortality NOEC - Daphnia (water flea) - 0.101 - 0.14 mg/l - 7 d

12.2 Persistence and degradability

12.3 Bioaccumulative potential

Bioaccumulation	Algae - 7 d at 16 °C - 5 µg/l
	Bioconcentration factor (BCF): 466

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
An environmental hazard cannot be excluded in the event of unprofessional handling or disposal.
Very toxic to aquatic life.

13. DISPOSAL CONSIDERATIONS

13.1 Waste treatment methods

Product
Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1436 Class: 4.3 (4.2) Packing group: II
Proper shipping name: Zinc powder
Reportable Quantity (RQ): 1000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1436 Class: 4.3 (4.2) Packing group: II EMS-No: F-G, S-O
Proper shipping name: ZINC POWDER
Marine pollutant:yes

IATA
UN number: 1436 Class: 4.3 (4.2) Packing group: II
Proper shipping name: Zinc powder

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
The following components are subject to reporting levels established by SARA Title III, Section 313:

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

SARA 311/312 Hazards
Reactivity Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Zinc powder (pyrophoric)	7440-66-6	1993-04-24

California Prop. 65 Components
This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

16. OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3.

Aquatic Acute	Acute aquatic toxicity
Aquatic Chronic	Chronic aquatic toxicity
H251	Self-heating: may catch fire.
H260	In contact with water releases flammable gases which may ignite spontaneously.
H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
Self-heat.	Self-heating substances and mixtures

HMIS Rating
Health hazard: 0

Chronic Health Hazard:	
Flammability:	3
Physical Hazard	1

NFPA Rating

Health hazard:	0
Fire Hazard:	3
Reactivity Hazard:	1
Special hazard.I:	W

Further information

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The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Preparation Information

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 4.9 Revision Date: 08/24/2015 Print Date: 02/07/2016

ATTACHMENT F

JOBSITE SAFETY INSPECTION CHECKLIST

Jobsite Safety Inspection Checklist

Date: _____ **Inspected By:** _____

Location: _____ **Project #:** _____

Check one of the following: **A:** Acceptable **NA**: Not Applicable **D**: Deficiency

	A	NA	D	Remark
1. HASP available onsite for inspection?				
2. Health & Safety Compliance agreement (in HASP) appropriately signed by Langan employees and contractors?				
3. Hospital route map with directions posted on site?				
4. Emergency Notification List posted on site?				
5. First Aid kit available and properly stocked?				
6. Personnel trained in CPR/First Aid on site?				
7. MSDSs readily available, and all workers knowledgeable about the specific chemicals and compounds to which they may be exposed?				
8 Appropriate PPE being worn by Langan employees and contractors?				
9. Project site safe practices ("Standing Orders") posted?				
10. Project staff have 40-hr./8-hr./Supervisor HAZWOPER training?				
11. Project staff medically cleared to work in hazardous waste sites and fit-tested to wear respirators, if needed?				
12. Respiratory protection readily available?				
13. Health & Safety Incident Report forms available?				
14. Air monitoring instruments calibrated daily, and results recorded on the Daily Instrument Calibration check sheet?				
15. Air monitoring readings recorded on the air monitoring data sheet/field logbook?				
16. Subcontract workers have received 40-hr./8-hr./Spvsr. HAZWOPER training, as appropriate?				
17. Subcontract workers medically cleared to work on site, and fit-tested for respirator wear?				
18. Subcontract workers have respirators readily available?				
19. Mark outs of underground utilities done prior to initiating any subsurface activities?				

20. Decontamination procedures being followed as outlined in HASP?				
21. Are tools in good condition and properly used?				
22. Drilling performed in areas free from underground objects including utilities?				
23. Adequate size/type fire extinguisher supplied?				
24. Equipment at least 20 feet from overhead powerlines?				
25. Evidence that drilling operator is responsible for the safety of his rig.				
26. Trench sides shored, layer back, or boxed?				
27. Underground utilities located, and authorities contacted before digging?				
28. Ladders in trench (25-foot spacing)?				
29. Excavated material placed more than 2 feet away from excavation edge?				
30. Public protected from exposure to open excavation?				
31. People entering the excavation regarding it as a permit-required confined space and following appropriate procedures?				
32. Confined space entry permit is completed and posted?				
33. All persons knowledgeable about the conditions and characteristics of the confined space?				
34. All persons engaged in confined space operations have been trained in safe entry and rescue (non-entry)?				
35. Full body harnesses, lifelines, and hoisting apparatus available for rescue needs?				
36. Attendant and/or supervisor certified in basic first aid and CPR?				
37. Confined space atmosphere checked before entry and continuously while the work is going on?				
38. Results of confined space atmosphere testing recorded?				
39. Evidence of coordination with off-site rescue services to perform entry rescue, if needed?				
40. Are extension cords rated for this work being used and are they properly maintained?				
41. Are GFCIs provided and being used?				

Unsafe Acts: _____

_____

_____

_____

Notes: _____

_____

_____

_____

ATTACHMENT G

JOB SAFETY ANALYSIS FORM

LANGAN	**Job Safety Analysis (JSA)** **Construction Health and Safety**
JSA TITLE: **JSA NUMBER:**	**DATE CREATED:** **CREATED BY**: **REVISION DATE:** **REVISED BY:**
Langan employees must review and revise the Job Safety Analysis (JSA) as needed to address the any site-specific hazards not identified. Employees must provide their signatures on the last page of the JSA indicating they have review the JSA and are aware the potential hazards associated with this work and will follow the provided preventive or corrective measures.	

PERSONAL PROTECTIVE EQUIPMENT REQUIRED: (PPE): ■ Required ☒ As Needed		
☐ Steel-toed boots	☐ Nitrile gloves	☐ Dermal Protection (Specify)
☐ Long-sleeved shirt	☐ Leather/ Cut-resistant gloves	☐ High visibility vest/clothing
☐ Safety glasses	☐ Face Shield	☐ Hard hat
ADDITIONAL PERSONAL PROTECTIVE EQUIPMENT NEEDED (Provide specific type(s) or descriptions)		
☐ Air Monitoring:	☐ Respirators:	☐ Other:
☐ Dermal Protection:	☐ Cartridges:	☐ Other:

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE OR CORRECTIVE ACTION
1.	1. 2.	1a. 1b. 2a. 2b.
2.	1.	1
Additional items identified in the field.		
Additional Items.		

If additional items are identified during daily work activities, please notify all relevant personnel about the change and document on this JSA.

LANGAN	Job Safety Analysis (JSA) Construction Health and Safety
JSA Title: COVID-19 Awareness – Site Work **JSA Number: JSA046-00**	
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Boots	☐ Long Sleeves	☐ Safety Vest (Class 2)	☐ Hard Hat	☐ Hearing Protection
☐ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Alcohol-based hand sanitizer, disinfectant wipes/spray				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. All Activities	1. Transmittal/exposure of COVID-19	1. Ask yourself and your managers – is this work essential? Can this be done remotely? 2. Stay home if sick or showing symptoms of COVID-19 (e.g., fever, cough, etc.). 3. Carry nitrile gloves, alcohol-based hand sanitizer, face coverings and disinfectant wipes/spray during field work. 4. Check federal, state, and/or local travel restrictions **prior** to travel. Many states, counties, and cities are passing strict "shelter-in-place" or business restrictions in response to COVID-19. 5. Immediately notify Beverly Williams or Rory Johnston (Supervisor if employee chooses) if you display symptoms of COVID-19. Symptoms include fever (over 100.4 F), cough, and shortness of breath. 6. Notify Beverly Williams or Rory Johnston, Supervisor and Coronavirus Task Force if you had close contact with an individual who tested positive or displayed symptoms of COVID-19. 7. Do not touch your face, to the extent possible. 8. Wear face coverings when around other worker to minimize spread of COVID-19. (May be required in certain states or locations.)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		9. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. Avoid gatherings of more than 10 people. Limit, to the extent possible, contact with public items/objects. 10. Clean your hands frequently with soap and water for at least 20 seconds especially after you have been in a public place, or after blowing your nose, coughing, sneezing, or using the rest room. 11. If soap and water are not readily available, use a hand sanitizer that contains at least 60% alcohol. Cover all surfaces of your hands and rub them together until they feel dry. 12. Cover your mouth and nose with a tissue when you cough or sneeze or use the inside of your elbow. 13. Clean and disinfect frequently touched surfaces daily, for example, cell phones, computer equipment, headsets, tables, doorknobs, light switches, countertops, handles, desks, toilets, faucets, and sinks.
2. Travel to Jobsite	1. Transmittal/exposure of COVID-19 between passengers 2. Transmittal/exposure of COVID-19 from previous occupants (rental and fleet vehicles) 3. Transmittal/exposure of COVID-19 while refueling	1. Limit the number of occupants to each vehicle to 2 people. Employees should sit as far away from each other as possible. 2. Disinfect high "hand-traffic" areas of the vehicle: Door handles, steering wheel, turn signal and control rods, dashboard controls, seatbelts, armrests, etc. To the extent possible, do not use recycled air for heat/AC and travel with the windows open. 3. Use hand sanitizer before and after pumping gas and only return to the inside of the vehicle after refueling is complete. 4. Wear nitrile gloves if available or disinfect the keypad, pump handle, and fuel grade button prior to use. 5. Recommend face coverings are worn to minimize spread of COVID-19.
3. Conduct Tailgate Safety Meeting & Complete H&S Paperwork	1. Transmittal/exposure of COVID-19 between meeting participants	1. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. Hold meetings outside and keep in mind wind direction. To the extent possible, remain crosswind from other people. 4. Designate a single person to maintain sign-in sheets/permits throughout the day to limit the passing of pens/clipboards between people. 5. Each person should complete their own JSA, even if they are completing similar tasks as others in order to limit the passing of paper/pens/clipboards between people. 6. Include COVID-19 topics and prevention measures in safety meetings.
4. Conduct Site Work	1. Transmittal/exposure of COVID-19 between site workers and public.	1. Practice social distancing maintaining 6 feet of distance between yourself and others. 2. Recommend face coverings are worn when around other workers to minimize spread of COVID-19, 3. To the extent possible, do not interact with the public. If it is necessary, politely explain you are practicing social distance and request they stay at least 6 feet away and they do not attempt to pass objects to you. 4. Wear nitrile gloves during site work underneath the appropriate gloves for your task. Utilize appropriate decontamination procedures, securely bag all waste (including nitrile gloves) generated during site work and dispose of.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Do not share tools. Each person should be equipped with the tools to complete their task or tasks should be divided to remove the need to share tools. If tools must be shared, surfaces should be disinfected. 6. Clean and disinfect surfaces of rental tools and equipment upon receipt. To the extent possible rent equipment from Langan's internal equipment reservation center, where cleaning/disinfecting procedures can be verified.
5. Use of Construction Trailers	1. Transmittal/exposure of COVID-19 between site workers and others.	1. Avoid use of shared trailers, if possible. Minimize trailer use to essential personnel. 2. Practice social distancing; maintaining 6 feet of distance between yourself and others in trailer. 3. Clean and disinfect areas including desks, phones, chairs, and other common areas, before and after use.
6. Purchasing Food from a Restaurant	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	1. To the extent possible, bring your own food. 2. If you must visit a restaurant, call ahead for take-out or "contactless delivery." Do not dine in. When picking up food, follow guidelines for Job Step #8: Purchasing Supplies at Retail/Shipping Centers. 3. Wash hands before and after eating.
7. Smoking Cigarettes	1. Transmittal/exposure of COVID-19 by touching mouth with hands	1. Cigarette smokers are at greater risk of complications arising from COVID-19. Nicotine patches/lozenges/gum, smoking cessation programs, and prescription medications may aid in "kicking the habit" if you decide to quit. 2. Wash hands thoroughly before and after smoking. 3. Discard cigarette butts properly. Do not light cigarettes from others and do not give cigarettes to others.
8. Hotel Stay	1. Transmittal/exposure of COVID-19 from previous occupants, hotel staff, common areas.	1. Verify the hotel chain/brand has modified cleaning procedures to reflect risk of COVID-19. Most hotel companies have issued statements on their websites and in email blasts reflecting these new procedures. 2. Use the front door, and not peripheral entrances. Front doors of hotels are usually automatic. 3. Request ground floor room to avoid elevator use and a room that has not be utilized in 48-72 hours. 4. If elevator use is required, do not directly touch elevator buttons with your hands. Do not ride elevators with other people, to the extent possible. 5. Bring disinfecting wipes or sanitizing spray. Upon arrival, disinfect high "hand-traffic" areas of the hotel room: Door handles, light switches, shower/sink faucet handles, TV remote, curtain/blind handles. Clean these surfaces daily. 6. Place the "Do Not Disturb" Sign on your door to prevent people (housekeeping) from entering your room. 7. Avoid common spaces and hotel sponsored events where crowds will be present. 8. Confirm hotel cleaning procedures have been modified to address COVID-19. Confirm no COVID-19 cases have occurred in hotel
9. Purchasing Supplies at Retail/Shipping Centers	1. Transmittal/exposure of COVID-19 from other customers, staff, surfaces.	1. Plan your travel to limit the need to visit retail/shipping centers. 2. Practice social distancing, maintaining at least 6 feet of distance between yourself and others. If the store is too crowded/small, consider visiting another store or returning at a different time. 3. Avoid high "hand-traffic" items/areas like door handles (i.e. use your shoulder, hip/butt, or open with a disposable napkin/paper towel), credit cards terminals (i.e. use Apple/Android pay if available), shopping carts/baskets (i.e. bring your own shopping

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		bags), counter tops (i.e. ask clerk if you can hold the items while they are scanned) and bulk/buffet items (i.e. just avoid them). 4. Disinfect your hands before and after visiting a retail/shipping center.

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Construction Health and Safety
JSA Title: Environmental Sampling **JSA Number:** JSA021-01 **A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.**	 **S** – ***Stop,*** *what has changed?* **T** – ***Think*** *about the task* **E** – ***Evaluate*** *potential hazards* **P** – ***Plan*** *safe approach* **S** - ***Start*** *task / **Stop** & regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☒ Fire Resistant Clothing	☐ Rubber Boots
☒ Insect/Animal Repellent	☒ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
1. Drive to sample location	1. Rough/Off Road terrain	1. Pay attention to road conditions such as road erosion, unprotected embankments, and soft road conditions.
2. Sample Collection (Walking)	1. Slip/Trips/Falls 2. Back strains 3. Wildlife (Insects, Stray animals, rodents) 4. Poisonous vegetation	1. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles. 2. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe and unsafe to carry. 3. Be aware of surroundings for the presence of wildlife. Do not approach stray animals. Carry and use animal repellant when needed/ Use bug spray when needed. 4. Keep skin covered/ Identify and avoid poisonous vegetation/ Clean areas after contact with suspected vegetation.
3. Sample Collection (Water)	1. Drowning Hazards 2. Chemical burns (when adding acid preservative to sample) 3. Back Strains 4. Ergonomic issues 5. Slip/Trips/Falls	1. Use buddy system/ Wear flotation vest if water is deeper than 2 feet or swift moving/ Select working area with stable footing. Do not attempt to cross or stand in swift moving water. 2. Wear proper PPE (Nitrile gloves, Tyvek Sleeves) 3. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe or unsafe to carry. 4. When possible, avoid bending over for long periods of time/ Use a small stool for sitting or knee pad for kneeling.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles/ Avoid standing water or slippery terrain.
4. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Construction Health and Safety

JSA Title: **Subsurface Investigation**
JSA Number: **JSA030-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Dielectric Overshoes, Sun Block				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Transport equipment to work area	2. Back/strain 3. Slip/Trip/Falls 4. Traffic 5. Cuts/abrasions/contusions from equipment 6. Accidents due to vehicle operations	1. Use proper lifting techniques/Use wheeled transport 2. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes) 5. Observe posted speed limits/ Wear seat belts at all times
6. Traffic	1. Hit by moving vehicle	1. Use traffic cones and signage/ Use High visibility traffic vests and clothing/ Caution tape when working near active roadways.
7. Field Work (drilling, resistivity testing, and inspection)	1. Biological Hazards: insects, rats, snakes, poisonous plants, and other animals 2. Heat stress/injuries 3. Cold Stress/injuries 4. High Energy Transmission Lines 5. Underground Utilities 6. Electrical (soil resistivity testing)	1. Inspect work area to identify biological hazards. Wear light colored long sleeve shirt and long pants/ Use insect repellant as necessary/ Beware of tall grass, bushes, woods, and other areas where ticks may live/ Avoid leaving garbage on site to prevent attracting animals/ Identify and avoid contact with poisonous plants/Beware of rats, snakes, or stray animals. 2. Wear proper clothing (light colored)/ drink plenty of water/ take regular breaks/use sun block. 3. Wear proper clothing/ dress in layers/ take regular breaks. 4. Avoid direct contact with high energy transmission lines/ position equipment at least 15 feet or as required by PSE&G from the transmission lines/ wear proper PPE (dielectric overshoes 15 kV minimum rating).

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		5. Call one-call service before performing intrusive field work/ Review utility mark-outs and available utility drawings (with respect to proposed work locations)/ Follow Underground Utility Guidelines 6. See AGI Sting R1 operating manual for specific concerns during operating instrument
8. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	7. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 8. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 9. Wear Langan approved safety shoes. 10. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 11. Wear high visibility clothing & vest / Use cones or signs to designate work area. 12. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 13. Wear proper hearing protection. 14. Wear hard hat / Avoid areas where overhead hazards exist. 15. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 16. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Construction Health and Safety
JSA Title: Field Sampling **JSA Number:** JSA022-01 **A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.**	 S – *Stop,* what has changed? T – *Think* about the task E – *Evaluate* potential hazards P – *Plan* safe approach S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☐ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
9. Unpack/Transport equipment to work area.	7. Back Strains 8. Slip/Trips/Falls 9. Cuts/Abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniques/Use wheeled transport. 7. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 8. Wear proper PPE (leather gloves, long sleeves). 9. Wear proper PPE (Langan approved safety shoes).
10. Initial Site Arrival-Site Assessment	5. Traffic	5. Situational awareness (be alert of your surroundings). Secure area from through traffic.
11. Surface Water Sampling	6. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	6. Wear appropriate PPE (Safety glasses, appropriate gloves). Review (M)SDS for all chemicals being.
12. Sampling from bridges	1. Struck by vehicles	1. Wear appropriate PPE (Safety Vest). Use buddy system and orange safety cones.
13. Icing of Samples/ Transporting coolers/equipment from work area.	11. Back Strains 12. Slips/Trips/Falls 13. Cuts/Abrasions from equipment 14. Pinch/Crushing Hazards.	17. Drain coolers of water. Use proper lifting techniques. Use wheeled transport. 18. Have unobstructed path from work area. Aware of surroundings. 19. Wear proper PPE (Leather gloves, long sleeves) 20. Wear proper PPE (Leather gloves, long sleeves)
14. Site Departure	1. Contaminated PPE/Vehicle	1. Contaminated PPE should be disposed of on-site. Remove boots and soiled clothing for secure storage in trunk. Wash hands promptly.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
15. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 21. Wear high visibility clothing & vest / Use cones or signs to designate work area. 22. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 23. Wear hearing protection 24. Wear hard hat / Avoid areas where overhead hazards exist. 25. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 26. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Construction Health and Safety
JSA Title: Equipment Transportation and Set-up **JSA Number:** JSA012-01	 **S** – ***Stop,*** *what has changed?* **T** – ***Think*** *about the task* **E** – ***Evaluate*** *potential hazards* **P** – ***Plan*** *safe approach* **S** - ***Start*** *task /* ***Stop*** *& regroup*
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
16. Transport equipment to work area	11. Back Strain 12. Slips/ Trips/ Falls 13. Traffic 14. Cuts/abrasions from equipment 15. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport. 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
17. Moving equipment to its planned location	6. Pinch Hazard 7. Slips/ Trips/ Falls	1. Wear proper PPE (leather gloves) 2. Be aware of potential trip hazards / Practice good housekeeping procedures / Mark significant below-grade hazards (i.e., holes, trenches) with safety cones or spray paint
18. Equipment Set-up	7. Pinch Hazard 8. Cuts/abrasions to knuckles/hands. 9. Back Strain	1. Wear proper PPE (leather gloves) 2. Wear proper PPE (leather gloves) 3. Use proper lifting techniques / Use wheeled transport
19. All activities	21. Slips/ Trips/ Falls 22. Hand injuries, cuts, or lacerations during manual handling of materials 23. Foot injuries 24. Back injuries 25. Traffic 26. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.)	27. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 28. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 29. Wear Langan approved safety shoes.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. All activities (cont'd)	27. High Noise levels 28. Overhead hazards 29. Heat Stress/ Cold Stress 30. Eye Injuries	30. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 31. Wear high visibility clothing & vest / Use cones or signs to designate work area. 32. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 33. Wear hearing protection 34. Wear hard hat / Avoid areas where overhead hazards exist. 35. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 36. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Construction Health and Safety

JSA Title: 55-gallon Drum Sampling
JSA Number: JSA043-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – *Stop, what has changed?*
T – *Think about the task*
E – *Evaluate potential hazards*
P – *Plan safe approach*
S - *Start task / Stop & regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: All Drums are required to be labeled. Langan employees do not open or move undocumented drums or unlabeled drums without proper project manager authorization.				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
20. Unpack/Transport equipment to work area.	16. Back Strains 17. Slip/Trips/Falls 18. Cuts/Abrasions from equipment 4. Contusions from dropped equipment	10. Use proper lifting techniques/Use wheeled transport. 11. Minimize distance to work area/Unobstructed path to work area/follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones. 12. Wear proper PPE (leather gloves, long sleeves). 4. Wear proper PPE (Langan approved safety shoes).
21. Open Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 2. Pressure from drums.	1. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 2. Open drum slowly to relieve pressure. Wear proper PPE: face shield and goggles; correct gloves; and over garments.
22. Collecting Soil/Fluid Sample	8. Irritation to eye from vapor, soil dust, or splashing. 9. Irritation to exposed skin	6. Wear proper eye protection including safety glasses/ face shield/googles and when necessary, splash guard. If dust or vapor phase is present, wear appropriate safety breathing gear (1/2 mask or full face mask with correct filter) 7. Wear proper skin protection including nitrile gloves.
23. Closing Drums	1. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid.	7. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
24. Moving Drums	2. Hand Injuries, cuts or lacerations when untightening drum locking bolt, removing drum lid strap, or removing lid. 3. Back Strains	2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. Use non-metallic mallet and non-sparking tools/wrenches. 3. Use proper lifting techniques/Use wheeled transport.
25. All activities	31. Slips/ Trips/ Falls 32. Hand injuries, cuts, or lacerations during manual handling of materials 33. Foot injuries 34. Back injuries 35. Traffic 36. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 37. High Noise levels 38. Overhead hazards 39. Heat Stress/ Cold Stress 40. Eye Injuries	37. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 38. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 39. Wear Langan approved safety shoes. 40. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 41. Wear high visibility clothing & vest / Use cones or signs to designate work area. 42. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 43. Wear hearing protection 44. Wear hard hat / Avoid areas where overhead hazards exist. 45. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 46. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Construction Health and Safety

JSA Title: Direct-Push Soil Borings
JSA Number: JSA004-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
26. Move equipment to work site	19. Back strain when lifting equipment. 20. Slips/ Trips/ Falls while moving equipment. 21. Traffic (if applicable) 22. Pinched fingers or running over toes during GeoProbe set-up. 23. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	13. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 14. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 15. Wear high visibility safety vests or clothing / Exercise caution 16. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 17. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
27. Calibration of monitoring equipment	10. Skin or eye contact with calibration chemicals 11. Pinch fingers in monitoring equipment	8. Wear proper PPE (safety glasses/ goggles) 9. Wear proper PPE (leather gloves)
28. Set-up GeoProbe rig	10. Geoprobe rig movement	8. All field personnel should stay clear of the GeoProbe rig while moving / Use a spotter when backing up the GeoProbe
29. Advance GeoProbe rods below ground surface to desired depth	4. Underground utilities 5. High noise levels	4. Clean all subsurface soil borings to a minimum of 5 feet below grade. 5. Wear proper PPE (hearing protection)
30. Remove and open acetate liner.	41. Pinched fingers while removing macrocore.	1. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 2. Wear proper PPE (cut-resistant or leather gloves)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
5. Remove and open acetate liner (cont'd)	42. Cuts/lacerations when cutting acetate liner open. 43. Exposure to hazardous vapors 44. Skin contacts with contaminated soil	3. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Construction Health and Safety Plan 4. Wear proper PPE (nitrile gloves)
31. Sample Collections a) Monitor parameters. b) Prepare sample containers and labels	1. Contact with potentially contaminated soil. 2. Lacerations from broken sample bottles 3. Back strain while transporting full coolers. 4. Internal exposure to contaminants and metals through inhalation of dust 5. Slips/ Trips/ Falls	1. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 2. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage. 6. Use proper lifting techniques / Do not lift heavy loads without assistance. 7. Avoid creating dust / If necessary, wear a half mask respirator with applicable dust cartridge / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location. 8. Be alert / Follow good housekeeping procedures
32. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Cuts/lacerations from acetate liner 2. Pinched fingers/hand while opening/closing drum. 3. Skin contacts with contaminated soil 4. Soil debris in eyes	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (nitrile gloves) 4. Wear proper PPE (safety glasses)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
8. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	1. Back, arm or shoulder strain from moving drums. 2. Pinch fingers/hand in drum cart when moving drums. 3. Pinch fingers/hand when operating lift-gate on vehicle. 4. Contact with potentially contaminated groundwater when moving improperly sealed drums. 5. Slips when moving drums. 6. Drop drum on feet/toes	47. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance. 48. Wear proper PPE (cut-resistant or leather gloves) 49. Wear proper PPE (cut-resistant or leather gloves) 50. Wear proper PPE (nitrile gloves underneath work gloves) 51. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions. 52. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum
9. All activities 9. All activities (cont'd)	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 3. Wear Langan approved safety shoes. 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 5. Wear high visibility clothing & vest / Use cones or signs to designate work area. 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 7. Wear hearing protection 8. Wear hard hat / Avoid areas where overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date

Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Construction Health and Safety
JSA Title: Geophysical Investigation **JSA Number:** JSA023-01	 **S** – ***Stop,*** *what has changed?* **T** – ***Think*** *about the task* **E** – ***Evaluate*** *potential hazards* **P** – ***Plan*** *safe approach* **S** - ***Start*** *task /* ***Stop*** *& regroup*
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
33. Transport equipment to work area	24. Back/strain 25. Slip/Trip/Falls 26. Traffic 27. Cuts/abrasions/contusions from equipment	18. Use proper lifting techniques/Use wheeled transport 19. Minimize distance to work area/unobstructed path to work area/follow good housekeeping procedures 20. Wear proper PPE (high visibility vest or clothing) 21. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes)
34. Supervision of subcontractor and all other activities	12. Slip/Trips/Falls 13. Hand injuries 14. Foot injuries 15. Back injuries/Strains 16. Traffic 17. Wildlife a. Wildlife b. Mice/rats c. Vectors (i.e., mosquitoes, bees, etc.) 7. Heat/Cold Stress	10. Be aware of potential trip hazards/follow good housekeeping procedures/mark significant below-grade hazards (i.e., holes, trenches, wires, ropes) with safety cones or spray paint. 11. Wear proper PPE (leather gloves)/watch wear you place your hands/inspect material or equipment for jagged, rough, or slippery surfaces/ watch for pinch points/ wipe off slippery, wet, or dirty items prior to handling. 12. Wear proper PPE (Langan approved safety shoes)/ Be aware of uneven terrain) 13. Use proper lifting techniques/ Buddy system when lifting/ use wheeled transport. 14. Wear proper PPE (high-visibility shirts and vests)/ use cones if appropriate/ notify equipment operators of work area. 15. Be aware of surroundings at all times for the presence of wildlife. a. Do not approach stray animals. b. Carry animal repellant/ use if situation arises. c. Use bug spray when needed. 7. Wear proper attire for weather conditions (sunscreen, protective clothing in

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		sunlight or layer clothing in cold weather)/ drink plenty of fluids/ take regular breaks.
35. All activities	45. Slips/ Trips/ Falls 46. Hand injuries, cuts, or lacerations during manual handling of materials 47. Foot injuries 48. Back injuries 49. Traffic 50. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 51. High Noise levels 52. Overhead hazards 53. Heat Stress/ Cold Stress 54. Eye Injuries	53. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 54. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 55. Wear Langan approved safety shoes. 56. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 57. Wear high visibility clothing & vest / Use cones or signs to designate work area. 58. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 59. Wear proper hearing protection. 60. Wear hard hat / Avoid areas where overhead hazards exist. 61. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 62. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Ladder Use**
JSA Number: **JSA056**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☐ Long Sleeves	☐ Safety Vest (Class 2)	☐ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☒ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
36. Use of Ladders and Inspection of Ladders Before Use	1. Ladders (portable, fixed) 2. Rolling or pinching objects 3. Sharp objects	22. Inspect all ladders for structural defects prior to each use. Decals, weight restrictions, non painted surfaces. 23. Use the correct type and size of ladder to safely work. 24. . Do not use metal or wooden ladders
37. Use of Ladder(s)	18. Ladders (portable, fixed) 19.Elevated work platform or stairs 20.Slippery surfaces (water, ice, snow) 21.Rolling or pinching objects 22.Sharp objects 23.Poor Housekeeping 24.Repetitive motion or other ergonomic concerns 25.Airborne dust	16. Maintain three points of contact when ascending and descending ladders. 17. Insure area at bottom of ladder is free of obstructions and tripping hazards. 18. Never carry tools in your hands while ascending or descending a ladder. 19. Utilize rope buckets to pull tools up to you or tool belts. Extension ladders will extend up to 36 inches above the landing that is being accessed and be tied off and secured to prevent them from moving or falling. 20. A spotter must hold the ladder if the employee needs to climb the ladder to tie the ladder off. When using an extension ladder, for every 4' of rise, the base must come out 1' (4 to 1 ratio)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		21. If working from a ladder 6 ft. or higher, fall protection is required. Fall protection is not required for climbing ladders less than 20 ft. in height. 22. Use the proper ladder for the job at all times. 23. The belt buckle may never extend past either rail on the side of the ladder. 24. Do not climb higher than the second tread from the top on a stepladder or the third rung 25. Before ascending or descending a ladder, wait until other workers have completely cleared the ladder. Do not stand directly below a person who is climbing or descending a ladder to avoid falling objects.
38. All activities	55. Slips/ Trips/ Falls 56. Hand injuries, cuts or lacerations during manual handling of materials 57. Foot injuries 58. Back injuries 59. Eye Injuries	63. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 64. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 65. Wear proper PPE (Langan approved safety shoes) 66. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 67. Wear high visibility clothing & vest / Use cones or signs to designate work area 68. Wear hard hat / Avoid areas were overhead hazards exist. 69. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 70. Wear safety glasses

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Soil Sampling from Excavator Bucket
JSA Number: JSA057

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – *Stop*, what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☐ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☐ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
39. Drive to site and/or sample location.	28. Rough/Off-Road terrain; 29. Low-light or other hazardous environmental conditions.	1. Pay attention to road conditions such as road erosion, unprotected embankments, and soft road conditions; 2. Ensure vehicle is properly equipped and outfitted for the terrain and all environmental conditions.
40. Initial Site Arrival Site Assessment.	1. Unsafe driving conditions including personnel walking within driving areas, open excavation or pits, steep slopes etc.; 2. Biological hazards (snakes, poison oak, bees).	1. Maintain situational awareness upon arriving to the work site (be alert of your surroundings). Secure the work area from through traffic.
41. Unpack and transport equipment to work area.	1. Back Strains; 2. Slip/Trips/Falls; 3. Cuts/Abrasions from equipment; 4. Contusions from dropped equipment.	1. Use proper lifting techniques and use wheeled transport; 2. Minimize distance to work area and create unobstructed path to work area. Follow good housekeeping procedures. Mark slip/trip/fall hazards with orange safety cones and/or caution tape; 3. Wear proper PPE (gloves, long sleeves, etc.); 4. Wear proper PPE (Langan-approved safety shoes, hardhat, etc.).
42. Earth Moving Equipment.	1. Equipment striking, crushing, running over employee etc.	1. Place traffic cones and use caution tape to clearly delineate the excavators front and rear swing radius. Do not enter the excavators or other heavy equipment swing radius/travel paths while in operation; 2. Ensure all employees working in the vicinity of the excavator/heavy equipment maintain direct line of sight with the operator at all times; don't walk behind equipment or within the operators blind spots; maintain a safe distance away from the equipment;

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		3. Designate one employee as the “spotter” to communicate with the excavator operator, and establish a shut-down signal that, when sounded, instructs the excavator operator to freeze/stop all movement of the equipment; 4. Direct operator to completely power down the excavator before approaching (i.e. breaking the swing radius plane) the excavator bucket to collect a sample; 5. Direct the operator keep the equipment completely powered-down until all employees are at a safe distance, and it is safe to continue work. The designated spotter should be the only person directing the operator to power the equipment back on. 6. Conduct a planned pause anytime there is a change in procedure or before beginning a new task; 7. Wear proper PPE (high vis vest/clothing).
43. Icing of Samples & Transporting coolers/equipment from work area.	1. Back Strains 2. Slips/Trips/Falls 3. Cuts/Abrasions from equipment 4. Pinch/Crushing Hazards.	1. Drain coolers of water. Use proper lifting techniques. Use wheeled transport whenever possible; 2. Plan for and utilize a safe and unobstructed path of travel to and from work area. Maintain situational awareness when traveling to and from work area; 3. Wear proper PPE (Leather gloves, long sleeves); 4. Wear proper PPE (Leather gloves, long sleeves, hard hat, Langan approved safety shoes).
44. Excavated soil.	1. Hazardous substances.	1. Use proper equipment to monitor excavated soil for contaminates; 2. Ensure levels do not exceed PEL’s for contaminates; 3. Wear proper PPE.
45. Changing site conditions.	1. Stockpiles and/or excavations/trenches/pits creating unsafe paths of travel. 2. Unforeseen conditions	1. Take time to plan out stockpile, excavation, trench, and/or test pit locations, ensuring that the planned work will not create unsafe conditions or paths of travel once performed; 2. Maintain situational awareness throughout the work day (be alert of the evolving site conditions); 3. If stockpile, excavation, trench, and/or test pit locations create pinch points, site constraints, or unsafe paths of travel or other unsafe site conditions, stop work immediately and direct the excavator operator to correct the unsafe conditions by moving stockpiles, backfilling excavations, trenches, and/or test pits etc.; 4. Use stop work and conduct a planned pause to address changed site conditions.
46. All activities.	1. Slips/ Trips/ Falls; 2. Hand injuries, cuts or lacerations during manual handling of materials; 3. Foot injuries; 4. Back injuries; 5. Traffic; 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.); 7. High Noise levels; 8. Overhead hazards;	1. Be aware of potential trip hazards. Follow good housekeeping procedures. Mark significant hazards; 2. Inspect for jagged/sharp edges, and rough or slippery surfaces. Keep fingers away from pinch points. Wipe off greasy, wet, slippery or dirty objects before handling. Wear proper PPE (leather/ cut-resistant gloves); 3. Wear proper PPE (Langan approved safety shoes); 4. Use proper lifting techniques. Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift. Obtain assistance when possible;

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	9. Heat Stress/ Cold Stress; 10. Eye Injuries.	5. Wear high visibility clothing & vest / Use cones or signs to designate work area; 6. Be aware of surroundings at all times, including the presence of wildlife. Do not approach stray dogs. Carry/use dog/animal repellant. Use bug spray when needed; 7. Wear hearing protection; 8. Wear hard hat / Avoid areas were overhead hazards exist; 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather). Drink plenty of fluids to avoid dehydration. Take breaks as necessary to avoid heat/cold stress; 10. Wear safety glasses

Print Name	**Sign Name**	**Date**
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: Groundwater Sampling **JSA Number:** JSA008-01	 **S** – ***Stop,*** *what has changed?* **T** – ***Think*** *about the task* **E** – ***Evaluate*** *potential hazards* **P** – ***Plan*** *safe approach* **S** - ***Start*** *task /* ***Stop*** *& regroup*
A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.	

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☒ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek sleeves, Dermal Protection, PID				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
47. Transport equipment to work area	1. Back Strain 2. Slips/ Trips/ Falls 3. Traffic 4. Cuts/abrasions from equipment 5. Contusions from dropped equipment	1. Use proper lifting techniques / Use wheeled transport. 2. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 3. Wear proper PPE (high visibility vest or clothing) 4. Wear proper PPE (leather gloves, long sleeves) 5. Wear proper PPE (safety shoes)
48. Remove well cover	26. Scrape knuckles/hand 27. Strain wrist/bruise palm 28. Pinch fingers or hand	3. Wear proper PPE (leather gloves) 4. Using a hammer, tap the end of the wrench to loosen grip of bolts. 5. Wear proper PPE (leather gloves)
49. Remove well cap and lock	11. Well can pops from pressure. 12. Exposure to hazardous substances through inhalation or dermal exposure 13. Scrape knuckles/hand 14. Strain write/bruise palm	5. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses) 6. Use direct air monitoring/reading instrument (i.e., PID) / Be familiar with and follow actions prescribed in the HASP / Wear proper PPE (nitrile gloves) 7. Wear proper PPE (leather gloves) 8. Using hammer, tap the end of the wrench to loosen grip
50. Measure head-space vapor levels	1. Exposure to hazardous substances through inhalation	1. Do not place face over well when collecting measurement
51. Remove dedicated tubing (if necessary)	1. Exposure to hazardous substances through inhalation or dermal exposure 2. Tubing swings around after removal	1. Wear proper PPE (nitrile gloves, Tyvek sleeves) 2. Wear proper PPE (safety glasses)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
52. Set-up plastic sheeting for work site around the well	1. Lacerations when cutting plastic sheeting.	1. Use scissors to cut plastic sheeting / Cut motions should always be away from body and body parts
53. Measure depth to water	1. Exposure to hazardous substances through inhalation or dermal exposure 2. Pinch fingers or hand in water level instrument	1. Wear proper PPE (nitrile gloves) 2. Wear proper PPE (leather gloves)
54. Calibrate monitoring equipment	1. Skin or eye contact with calibration chemicals 2. Pinch fingers or hand in monitoring equipment	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Wear proper PPE (leather gloves) / Avoid pinch points
55. Install sampling pump in well	1. Hand injuries during installation of pump 2. Lacerations when cutting tubing. 3. Back strain during installation of pump 4. Physical hazards associated with manual lifting of heavy equipment. 5. Back strain from starting generator. 6. Burns from hot exhaust from generator. 7. Electrical shock from improper use of generator and pump 8. Contaminated water spray from loose connections	1. Wear proper PPE (leather gloves, nitrile gloves) 2. Use safety tubing cutter. 3. Use proper lifting techniques. 4. Use proper lifting techniques / Use wheeled transport for heavy equipment. 5. Use arm when starting generator / Do not over-strain if generator does not start. 6. Do not touch generator near exhaust / Use proper handle to carry / Allow generator to cool down before moving. 7. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord. 8. Check all tubing connections to ensure they are tight and secure

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
10. Purge water	1. Contact with potentially contaminated groundwater. 2. Back strain from lifting buckets of water 3. Tripping potential on sample discharge lines and pump electric lines	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Use proper lifting techniques / Use wheeled transport. 3. Organize discharge of electric line to keep out of way as much as possible / Mark potential tripping hazards with caution tape or safety cones
11. Sample water collection	1. Contact with potentially contaminated groundwater through dermal exposure. 2. Contact with and burns from acid used for sample preservation. 3. Tripping potential on sample discharge lines and pump electric lines 4. Lacerations from broken sample bottles 5. Back strain when transporting coolers full of collected samples. 6. Slips/ Trips/ Falls	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Wear proper PPE (safety glasses, nitrile gloves) / Ensure sample bottle lids are secure before use and after sample collection. 3. Organize line to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones. 4. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible 5. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle. 6. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift
12. Remove pump and pack up equipment	1. Back strain when removing pump or lifting heavy equipment	1. Use proper lifting technique / Use wheeled transport for heavy equipment
13. Replace well cap and lock	1. Scrape fingers/hand 2. Strain wrist/bruise palm	1. Wear proper PPE (leather gloves) 2. Using hammer, tap the end of the well cap to tighten grip
14. Replace well cover	1. Scrape knuckles/hand 2. Strain write/bruise palm. 3. Pinch fingers or hand	1. Wear proper PPE (leather gloves) 2. Using hammer, tap the end of the wrench to tighten the grip of the bolts. 3. Wear proper PPE (leather gloves)
15. Transport drums to disposal staging location	1. Back, arm or shoulder strain from moving drums. 2. Pinch hazard 3. Contact with potentially contaminated groundwater when moving improperly sealed drums. 4. Slips/ Trips/ Falls when moving drum. 5. Drop drum on feet/toes	1. Use drum cart for moving drums / Use proper lifting techniques / Obtain assistance, if needed 2. Wear proper PPE (leather gloves) 3. Wear proper PPE (nitrile gloves under leather gloves) / Properly seal drum to prevent leak. 4. Ensure route to move drum to storage space is dry and free from obstructions. 5. Wear proper PPE (safety shoes)
16. Place used PPE in designated disposal drum	1. Pressure build-up inside drum 2. Pinch hazard	1. Remove cap from bung hole in drum to relieve pressure. 2. Wear proper PPE (leather gloves)
17. Decontaminate equipment	1. Splashing water/soap from decontamination 2. Contact with potentially contaminated groundwater through dermal exposure. 3. Electrical shock from broken electric cords	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (safety glasses, dermal protection) 3. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord
18. All activities	60. Slips/ Trips/ Falls 61. Hand injuries, cuts, or lacerations during manual handling of materials 62. Foot injuries 63. Back injuries 64. Traffic 65. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.)	71. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 72. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 73. Wear Langan approved safety shoes.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	66. High Noise levels 67. Overhead hazards 68. Heat Stress/ Cold Stress 69. Eye Injuries	74. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 75. Wear high visibility clothing & vest / Use cones or signs to designate work area. 76. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 77. Wear hearing protection 78. Wear hard hat / Avoid areas where overhead hazards exist. 79. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 80. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Well Installation**
JSA Number: **JSA019-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: PID, Tyvek sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
56. Move equipment to work site	30. Back strain when lifting equipment. 31. Slips/ Trips/ Falls while moving equipment. 32. Traffic (if applicable) 33. Pinched fingers or running over toes during GeoProbe set-up. 34. Overturn drilling rig while transporting to loading dock on flat-bed tow truck	25. Use proper lifting technique (use legs for bending and lifting and not the back)/ Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle 26. Use proper lifting technique (use legs for bending and lifting and not the back) / Use wheeled transport for heavy equipment / Get assistance when handling loads greater than 50 lbs. / Minimize distance to vehicle / Have unobstructed path to vehicle or collection point / Do not lift/walk with boxes that are heavy/difficult to lift 27. Wear high visibility safety vests or clothing / Exercise caution 28. Wear proper PPE (cut-resistant gloves) / Stay alert, be aware of geoprobe rig at all times 29. Drill rig should be parked in center of flat-bed tow truck / Emergency brake shall be used at all times during transport on the flat-bed truck/ All unnecessary personnel should stay away from the flat-bed truck during moving activities
57. Calibration of monitoring equipment	29. Skin or eye contact with calibration chemicals 30. Pinch fingers in monitoring equipment	26. Wear proper PPE (safety glasses/ goggles) 27. Wear proper PPE (leather gloves)
28. Set-up GeoProbe rig	15. Geoprobe rig movement	9. All field personnel should stay clear of the GeoProbe rig while moving / Use a spotter when backing up the GeoProbe
29. Advance GeoProbe rods below ground surface to desired depth	6. Underground utilities 7. High noise levels	9. Clean all subsurface soil borings to a minimum of 5 feet below grade. 10. Wear proper PPE (hearing protection)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
30. Remove and open acetate liner. 5. Remove and open acetate liner (cont'd)	70. Pinched fingers while removing macrocore. 71. Cuts/lacerations when cutting acetate liner open. 72. Exposure to hazardous vapors 73. Skin contacts with contaminated soil	5. Wear proper PPE (nitrile gloves, cut-resistant or leather gloves 6. Wear proper PPE (cut-resistant or leather gloves) 7. Do not place face over acetate liner when opening / Monitor hazardous vapors in air with PID / Upgrade PPE as necessary based on levels contained in the Health and Safety Plan 8. Wear proper PPE (nitrile gloves)
6. Remove excess soil from acetate liner and place in 55-gallon drum (IF NOT PERFORMED BY LANGAN, REMOVE!)	5. Cuts/lacerations from acetate liner 6. Pinched fingers/hand while opening/closing drum. 7. Skin contacts with contaminated soil 8. Soil debris in eyes	5. Wear proper PPE (cut-resistant or leather gloves) 6. Wear proper PPE (cut-resistant or leather gloves) 7. Wear proper PPE (nitrile gloves) 8. Wear proper PPE (safety glasses)
7. Attach hollow-stem augers to the GeoProbe rig; Advance augers and attach. additional augers until desired depth is reached	1. Strain wrist/bruise palm 2. Pinched fingers 3. Back Strain 4. Clothing entanglement 5. Carbon monoxide poisoning 6. Bruise toes/foot 7. High noise levels 8. Skin contacts with contaminated soil	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Use proper lifting techniques. 4. Wear proper work attire(no loose clothing/strings) 5. Properly ventilate work area 6. Wear proper PPE (safety shoes) 7. Wear proper PPE (hearing protection) 8. Wear proper PPE (Tyvek sleeves, nitrile gloves)
8. Install monitoring well	1. Pinched fingers 2. Lacerations/abrasions 3. Back Strain	1. Wear proper PPE (cut-resistant or leather gloves) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Use proper lifting techniques
9. Tremie-grout annulus space above bentonite seal	1. Back strain 2. Pinched fingers	1. Use proper lifting techniques. 2. Wear proper PPE (cut-resistant or leather gloves)
10. Install flush-mount monitoring well pad	1. Splashed concrete. 2. Pinched fingers 3. Cuts/lacerations	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (cut-resistant or leather gloves) 3. Wear proper PPE (cut-resistant or leather gloves)
11. Decontaminate equipment	1. Splashing water/soap 2. Contact with potentially contaminated groundwater/soil through dermal exposure. 3. Electrical shock from broken electric cords	1. Wear proper PPE (safety glasses) 2. Wear proper PPE (safety glasses, dermal protection) 3. Properly plug in pump to generator / Do not allow the pump or generator to contact water / Check for breaks in the cord
12. Transport drums to central staging location (IF NOT PERFORMED BY LANGAN, REMOVE!)	7. Back, arm or shoulder strain from moving drums. 8. Pinch fingers/hand in drum cart when moving drums. 9. Pinch fingers/hand when operating lift-gate on vehicle. 10. Contact with potentially contaminated groundwater when moving improperly sealed drums. 11. Slips when moving drums. 12. Drop drum on feet/toes	81. Use drum cart for moving drums / Use proper lifting techniques / Do not lift heavy loads without assistance. 82. Wear proper PPE (cut-resistant or leather gloves) 83. Wear proper PPE (cut-resistant or leather gloves) 84. Wear proper PPE (nitrile gloves underneath work gloves) 85. Follow good housekeeping procedures / Ensure route to move drum and storage space is free from obstructions. 86. Wear proper PPE (safety shoes) / Work in a safe manner to prevent dropped drum

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
13. All activities 13. All activities (cont'd)	11. Slips/ Trips/ Falls 12. Hand injuries, cuts, or lacerations during manual handling of materials 13. Foot injuries 14. Back injuries 15. Traffic 16. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 17. High Noise levels 18. Overhead hazards 19. Heat Stress/ Cold Stress 20. Eye Injuries	11. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 12. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 13. Wear Langan approved safety shoes. 14. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 15. Wear high visibility clothing & vest / Use cones or signs to designate work area. 16. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 17. Wear hearing protection 18. Wear hard hat / Avoid areas where overhead hazards exist. 19. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 20. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Monitoring Well Development**
JSA Number: **JSA026-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
58. Transport equipment to work area	35. Back Strains 36. Slips/Trips/Falls 37. Traffic 38. Cuts/Abrasions/Contusions from equipment	30. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 31. Minimize distance from work area/ unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 32. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 33. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
59. Measure depth of water	31. Exposure to hazardous substances 32. Pinched fingers	31. Wear proper PPE (Nitrile gloves, Safety glasses/Face shield). 32. Wear proper PPE (cut-resistant gloves).
60. Install Tremie pipe in the monitoring well and connect to water source.	16. Hand injuries during installation (pinched fingers/hands). 17. Back strain from holding Tremie pipe. 18. High pressure water spray.	10. Wear proper PPE (Nitrile gloves/cut-resistant gloves). 11. Use proper lifting techniques/ Use two personnel when lowering pump greater than 80 feet. 12. Ensure all those connections are tight and secure/ Use proper PPE (face shield and safety glasses).
61. Install pump in to well. a. Connect pump to sample tubing. b. Lower pump to desired depth in well. c. Connect sample tubing to flow cell. d. Connect pump to power source	8. Hand injuries during pump installation and sample tubing cutting. 9. Back strain 10. Electric shock 11. Exhaust gases from generator 12. Burns from hot equipment	11. Wear proper PPE when installing pump and cutting sample tubing (Nitrile and cut-resistant gloves)/ Use tubing cutter. 12. Proper lifting techniques/ Two personnel when installing pump at depths greater than 80 feet/ Use buddy when lifting heavy loads (pump, generator)/Use wheeled transport. 13. Ensure equipment is (LO/TO: locked out/tagged out) prior to preforming any electrical connections/ Inspect wires for frays or cuts/Ensure generator is properly grounded prior to starting.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
(generator) e. Turn on power source (generator)		14. Position generator so that exhaust is flowing away from work area. 15. Do not touch exhaust or any hot part of generator/ Allow equipment time to cool down prior to carrying/ Use proper PPE (long sleeves, leather gloves)
62. Develop monitoring well. a. Jet water into well using Tremie pipe. b. Turn pump on and adjust to desired flow rate. c. Surge pump up and down well to remove sediment from screen. d. Containerize all purge water from well.	74. Hand injuries 75. Face injuries 76. Contaminated spray from water	87. Wear proper PPE (cut-resistant gloves and nitrile gloves). 88. Wear proper PPE (face shield and safety glasses)/do not stand over well opening. 89. Wear proper PPE (Face shield and safety goggles)/Tyvek over garments/ Ensure all connections are secure and tight/ Tubing outlet is contained in an overflow container.
63. Drum staging area.	1. Back, Arm, and shoulder strain. 2. Pinch points 3. Cross contamination 4. Slip/Trips/Falls	1. Use proper lifting techniques/ Use drum carts when moving drums/ use buddy system for moving of drums if needed/Move drums shortest distance needed. 2. Keep fingers and feet away from pinch points/ Use proper PPE (cut-resistant gloves, Langan approved safety shoes) 3. Use proper PPE (Nitrile gloves, Tyvek sleeves) 4. Ensure pathway is clear prior to moving equipment/ Mark all hazards/ Use additional person as a spotter if needed.
64. Equipment pack-up	1. Back Strains 2. Slips/Trips/Falls 3. Traffic 4. Cuts/Abrasions/Contusions from equipment.	1. Use proper lifting techniques/ Use wheeled transport/ use buddy system when lifting equipment. 2. Minimize distance from work area/ Unobstructed path to collection points and vehicle/ Follow good housekeeping procedures. 3. Wear high-visibility vest or clothing/Exercise caution/ Use traffic cones or signage if needed. 90. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes).
65. All activities	1. Slips/ Trips/ Falls 2. Hand injuries, cuts, or lacerations during manual handling of materials 3. Foot injuries 77. Back injuries 78. Traffic 79. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 80. High Noise levels 81. Overhead hazards 82. Heat Stress/ Cold Stress 83. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas where overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses.
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Groundwater/Product Purging/Sampling with Bailer**
JSA Number: **JSA053**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☒ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek sleeves, Dermal Protection, PID, absorbent pads				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
66. Transport equipment to work area	6. Back Strain 7. Slips/ Trips/ Falls 8. Traffic 9. Cuts/abrasions from equipment 10. Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport. 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
67. Remove well cover	33. Scrape knuckles/hand 34. Strain wrist/bruise plan 35. Pinch fingers or hand	6. Wear proper PPE (leather gloves) 7. Using a hammer, tap the end of the wrench to loosen grip of bolts. 8. Wear proper PPE (leather gloves)
68. Remove well cap and lock	19. Well can pops from pressure. 20. Exposure to hazardous substances through inhalation or dermal exposure 21. Scrape knuckles/hand 22. Pinch points 23. Strain write/bruise palm	9. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses, face shield, hand protection) 10. Use direct air monitoring/reading instrument (i.e., PID) / Be familiar with and follow actions prescribed in the HASP / Wear proper PPE (nitrile gloves) 11. Wear proper PPE (leather gloves) 12. Using hammer, tap the end of the wrench to loosen grip
69. Measure head-space vapor levels	2. Exposure to hazardous substances through inhalation	2. Do not place face over well when collecting measurement
70. Set-up plastic sheeting/absorbent pads	2. Lacerations when cutting plastic sheeting/absorbent pads.	2. Use scissors to cut plastic sheeting/absorbent pads / Cut motions should always be away from body and body parts

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
for work site around the well		
71. Lower Bailer sleeve into well	7. Repetitive motion injury (pulled arm/back muscles) 8. Dehydration	7. Take breaks while lowering bailer into well/ Use a mechanical device to lower bailer into well/ Rotate employees (take turns conducting the manual labor portion) 8. Take breaks and drink water.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
7. Purge/Sample water/product collection	1. Contact with potentially contaminated groundwater or product through dermal exposure 2. Contact with and burns from acid used for sample preservation 9. Tripping potential on sampling lanyard 10. Lacerations from broken sample bottles 11. Back strain when transporting coolers full of collected samples. 12. Slips/ Trips/ Falls	1. Wear proper PPE (safety glasses, nitrile gloves, safety shield, Tyvek) 2. Ensure sample bottle lids are secure before use and after sample collection 3. Organize lanyard to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones 9. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible 10. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle. 11. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift
8. Retrieval of bailer	9. Repetitive motion injury (pulled arm/back muscles) 10. Dehydration	9. Take breaks while retrieving bailer out of the well/ Use a mechanical device to raise bailer out of well/ Rotate employees (take turns conducting the manual labor portion) 10. Take breaks and drink water.
9. Pack-up equipment	2. Back strain when removing or lifting heavy equipment	2. Use proper lifting technique / Use wheeled transport for heavy equipment
10. Replace well cap and lock	3. Scrape fingers/hand 4. Strain wrist/bruise palm	3. Wear proper PPE (leather gloves) 4. Using hammer, tap the end of the well cap to tighten grip
11. Replace well cover	4. Scrape knuckles/hand 5. Strain write/bruise palm. 6. Pinch fingers or hand	4. Wear proper PPE (leather gloves) 5. Using hammer, tap the end of the wrench to tighten the grip of the bolts. 6. Wear proper PPE (leather gloves)
12. Place used PPE in designated disposal drum	3. Pressure build-up inside drum 4. Pinch hazard	3. Remove cap from bung hole in drum to relieve pressure. 4. Wear proper PPE (leather gloves) 5. Product drums may require additional spill protection/electrical grounding, check local regulations
13. Decontaminate equipment	4. Splashing water/soap from decontamination 5. Contact with potentially contaminated groundwater through dermal exposure.	4. Wear proper PPE (safety glasses) 5. Wear proper PPE (safety glasses, dermal protection)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
14. All activities	84. Slips/ Trips/ Falls 85. Hand injuries, cuts, or lacerations during manual handling of materials 86. Foot injuries 87. Back injuries 88. Traffic 89. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 90. High Noise levels 91. Overhead hazards 92. Heat Stress/ Cold Stress 93. Eye Injuries	91. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 92. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 93. Wear Langan approved safety shoes. 94. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 95. Wear high visibility clothing & vest / Use cones or signs to designate work area. 96. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 97. Wear hearing protection 98. Wear hard hat / Avoid areas where overhead hazards exist. 99. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 100. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Hammer Drill
JSA Number: JSA049

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
72.Transport equipment to work area	39.Back Strain 40.Slips/ Trips/ Falls 41.Traffic 42.Cuts/abrasions from equipment 43.Contusions from dropped equipment	6. Use proper lifting techniques / Use wheeled transport. 7. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 8. Wear proper PPE (high visibility vest or clothing) 9. Wear proper PPE (leather gloves, long sleeves) 10. Wear proper PPE (safety shoes)
73.Electrical Connection	36.Inspect electrical cord to drill. 37.Inspect hammer drill. 38.Inspect extension cord. 39.Test GFCI	9. Check the plug, ensure all connections are in place, check cord for frayed sections. If plug or cord are worn, do not use equipment until repaired. 10. Inspect chuck for proper grasping and holding of bit, check that plastic housing is not cracked or missing pieces. Do not use if chuck does not work properly or housing is compromised. 11. Inspect extension cord, if worn or stripped pull from service and replace 12. Test GFCI, replace if GFCI fails
74.Drill Bit	1. Inspect drill bit	1. Replace if worn. 2. Wear proper PPE (leather gloves) when installing and removing drill bit. 3. Ensure equipment is unplugged from electrical power when removing and installing drill bit.
75.Use of Hammer Drill	1. Hazards associated with using hammer drill, flying objects, heavy equipment, ground level hazards and dust. 2. Slips/ Trips/ Falls 3. Hazards associated drilling into concrete slab	1. Maintain a safe distance from other site operations / Wear proper PPE (hard hat, safety glasses, safety shoes, safety vest, ear protection and leather gloves) 2. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark extension cord pathway with safety cones. 3. Do not push hammer drill during use.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
76. All activities 4. All activities (cont'd)	94. Slips/ Trips/ Falls 95. Hand injuries, cuts, or lacerations during manual handling of materials 96. Foot injuries 97. Back injuries 98. Traffic 99. Wildlife: Stray dogs, Mice/rats, Vectors (i.e., mosquitoes, bees, etc.) 100. High Noise levels 101. Overhead hazards 102. Heat Stress/ Cold Stress 103. Eye Injuries	101. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards. 102. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery, or dirty objects before handling / Wear leather/ cut-resistant gloves. 103. Wear Langan approved safety shoes. 104. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible. 105. Wear high visibility clothing & vest / Use cones or signs to designate work area. 106. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed. 107. Wear hearing protection 108. Wear hard hat / Avoid areas where overhead hazards exist. 109. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 110. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Hand Auger Soil Sampling
JSA Number: JSA003-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT REQUIRED:				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Half-face respirator, dust cartridges, PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
77. Unpack equipment	44. Slips/ Trips/ Falls 45. Physical hazards including strains and hand injury	1. Be aware of hazards in area/ Place safety cones in areas of potential slips/trips/falls 2. Use proper lifting techniques / Do not lift heavy loads without assitance / Avoid putting hands near pinch points / Wear proper PPE (leather gloves)
78. Calibration of monitoring equipment	40. Skin or eye contact with calibration chemicals 41. Pinch fingers in monitoring equipment	33. Wear proper PPE (safety glasses/ goggles) 34. Wear proper PPE (leather gloves)
79. Advancing and removing hand auger	24. Physical hazards including back strain and hand injury	13. Twist auger using arms and shoulders/ Do not over exert / Keep back in neutral position, bend at the knees / Request assistance when needed / Remove auger from ground keeping back in neutral position and lift using legs
80. Sample collections a) Monitor parameters b) Prepare sample containers and labels c) Collect soil sample d) Securely cap containers, label and store in sample cooler until shipping e) Deliver cooler to lab or courier to lab	13. Contact with potentially contaminated soil 14. Lacerations from broken sample bottles 15. Back strain with transporting coolers 16. Internal exposure to contaminants through inhalation of dust 17. Slips/ Trips/ Falls	16. Use monitoring devices / Wear proper PPE (safety glasses, nitrile gloves) 17. Do not over-tighten bottles caps / Handle bottles safety to prevent breakage 18. Use proper lifting techniques / Do not lift heavy loads without assistance 19. Avoid creating dust / If necessary, wear a half-face respirator with applicable dust cartridges / Inspect respirator for damage and cleanliness prior to use / Clean respirator after each use and store in a clean, secure location 20. Be alert / Follow good housekeeping procedures

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
81. Decontamination of equipment	104. Splashing water/soap from decontamination 105. Contact with potentially contaminated soil	111. Wear proper PPE (safety glasses, gloves) 112. Wear proper PPE (safety glasses, gloves)
82. All activities 6. All activities (cont'd)	1. Slips/ Trips/ Falls 2. Hand injuries, cuts or lacerations during manual handling of materials 3. Foot injuries 4. Back injuries 5. Traffic 6. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 7. High Noise levels 8. Overhead hazards 9. Heat Stress/ Cold Stress 10. Eye Injuries	1. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 2. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 3. Wear Langan approved safety shoes 4. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 5. Wear high visibility clothing & vest / Use cones or signs to designate work area 6. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 7. Wear hearing protection 8. Wear hard hat / Avoid areas were overhead hazards exist. 9. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 10. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN	Job Safety Analysis (JSA) Health and Safety
JSA Title: Groundwater/Product Purging/Sampling with Bailer **JSA Number:** JSA053 **A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.**	 S – **Stop,** *what has changed?* T – ***Think*** *about the task* E – ***Evaluate*** *potential hazards* P – ***Plan*** *safe approach* S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☒ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☒ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek sleeves, Dermal Protection, PID, absorbent pads				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
83. Transport equipment to work area	11. Back Strain 12. Slips/ Trips/ Falls 13. Traffic 14. Cuts/abrasions from equipment 15. Contusions from dropped equipment	11. Use proper lifting techniuqes / Use wheeled transport 12. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 13. Wear proper PPE (high visibility vest or clothing) 14. Wear proper PPE (leather gloves, long sleeves) 15. Wear proper PPE (safety shoes)
84. Remove well cover	42. Scrape knuckles/hand 43. Strain wrist/bruise plan 44. Pinch fingers or hand	13. Wear proper PPE (leather gloves) 14. Using a hammer, tap the end of the wrench to loosen grip of bolts 15. Wear proper PPE (leather gloves)
85. Remove well cap and lock	25. Well can pops from pressure 26. Exposure to hazardous substances through inhalation or dermal exposure 27. Scrape knuckles/hand 28. Pinch points 29. Strain write/bruise palm	13. Remove cap slowly to relieve pressure / Do not place face over well when opening / Wear proper PPE (safety glasses, face shield, hand protection) 14. Use direct air monitoring/reading instrument (i.e. PID) / Be familiar with and follow actions prescribed in the HASP / Wear proper PPE (nitrile gloves) 15. Wear proper PPE (leather gloves) 16. Using hammer, tap the end of the wrench to loosen grip
86. Measure head-space vapor levels	3. Exposure to hazardous substances through inhalation	3. Do not place face over well when collecting measurement
87. Set-up plastic sheeting/absorbent pads for work site around the well	3. Lacerations when cutting plastic sheeting/absorbent pads	3. Use scissors to cut plastic sheeting/absorbent pads / Cut motions should always be away from body and body parts

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
88. Lower Bailer sleeve into well	12. Repetitive motion injury (pulled arm/back muscles) 13. Dehydration	13. Take breaks while lowering bailer into well/ Use a mechanical device to lower bailer into well/ Rotate employees (take turns conducting the manual labor portion) 14. Take breaks and drink water.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
7. Purge/Sample water/product collection	1. Contact with potentially contaminated groundwater or product through dermal exposure 2. Contact with and burns from acid used for sample preservation 15. Tripping potential on sampling lanyard 16. Lacerations from broken sample bottles 17. Back strain when transporting coolers full of collected samples 18. Slips/ Trips/ Falls	1. Wear proper PPE (safety glasses, nitrile gloves, safety shield, Tyvek) 2. Ensure sample bottle lids are secure before use and after sample collection 3. Organize lanyard to keep out of the way as much as possible / Mark potential tripping hazards with caution tape or safety cones 14. Do not over-tighten bottle caps / Handle bottles safely to prevent breakage / Wrap glass bottles in bubble wrap, if possible 15. Use proper lifting techniques / Use wheeled transport / Seek assistance if coolers weight exceeds 50lbs. / Minimize distance to vehicle 16. Have unobstructed path to vehicle or collection point / Follow good housekeeping procedures / Do not lift/walk with coolers that are too heavy/difficult to lift
8. Retrieval of bailer	11. Repetitive motion injury (pulled arm/back muscles) 12. Dehydration	11. Take breaks while retrieving bailer out of the well/ Use a mechanical device to raise bailer out of well/ Rotate employees (take turns conducting the manual labor portion) 12. Take breaks and drink water.
9. Pack-up equipment	3. Back strain when removing or lifting heavy equipment	3. Use proper lifting technique / Use wheeled transport for heavy equipment
10. Replace well cap and lock	5. Scrape fingers/hand 6. Strain wrist/bruise palm	5. Wear proper PPE (leather gloves) 6. Using hammer, tap the end of the well cap to tighten grip
11. Replace well cover	7. Scrape knuckles/hand 8. Strain write/bruise palm 9. Pinch fingers or hand	7. Wear proper PPE (leather gloves) 8. Using hammer, tap the end of the wrench to tighten the grip of the bolts 9. Wear proper PPE (leather gloves)
12. Place used PPE in designated disposal drum	5. Pressure build-up inside drum 6. Pinch hazard	6. Remove cap from bung hole in drum to relieve pressure 7. Wear proper PPE (leather gloves) 8. Product drums may require additional spill protecton/electrical grounding, check local regulations
13. Decontaminate equipment	6. Splashing water/soap from decontamination 7. Contact with potentially contaminated groundwater through dermal exposure	6. Wear proper PPE (safety glasses) 7. Wear proper PPE (safety glasses, dermal protection)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
14. All activities	106. Slips/ Trips/ Falls 107. Hand injuries, cuts or lacerations during manual handling of materials 108. Foot injuries 109. Back injuries 110. Traffic 111. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 112. High Noise levels 113. Overhead hazards 114. Heat Stress/ Cold Stress 115. Eye Injuries	113. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 114. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 115. Wear Langan approved safety shoes 116. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 117. Wear high visibility clothing & vest / Use cones or signs to designate work area 118. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 119. Wear hearing protection 120. Wear hard hat / Avoid areas were overhead hazards exist. 121. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 122. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Sub-slab soil gas temporary point installation and sampling**
JSA Number: **JSA037-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – ***Stop,*** *what has changed?*
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P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☒ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Tyvek Sleeves				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
89. Transport equipment to work site	46. Back injuries 47. Slips/Trips/Falls 48. Traffic 49. Hand injuries	34. Use proper lifting techniques/ Use wheeled transport/ Get assistance when need with moving equipment/ Minimize distance from vehicle 35. Minimize distance from vehicle/ Have unobstructed pathway to vehicle and collection points/ Mark tripping hazards with spray paint, cones, or caution tape/ Observe good housekeeping procedures. 36. Wear proper PPE (High Visibility vest and clothing)/ Exercise caution (stay alert-stay alive) 37. Wear proper PPE (leather gloves)/ Keep finger and hands clear of pinch points.
90. Mark area for drilling	45. Slips/Trips/Falls	35. Minimize distance from vehicle/ Have unobstructed pathway to vehicle and collection points/ Mark tripping hazards with spray paint, cones, or caution tape/ Observe good housekeeping procedures
91. Drill sampling points with hammer drill	30. Eye injuries 31. Dust exposure 32. Hand injuries 33. Catch items (clothing) 34. Electric shock 35. Chemical atmosphere hazard (vapor) 36. Slips/Trips/Falls	14. Wear proper PPE (safety glasses) 15. Wear proper PPE (dust mask) 16. Wear proper PPE (leather gloves)/ Keep hands and fingers out of pinch points/ Avoid drill catching on ground and twisting wrist or hand/ Release drill grip if drill becomes caught/ Ensure drill is unplugged prior to inserting bit. 17. Tie up or tuck-in all loose clothing/ Maintain distance from drill 18. Inspect power cable for cuts or nicks before use/ Use GFCI outlet on power cord/ Do not use in wet conditions 19. Monitor air, vapors with Photo-ionization detector (PID)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		20. Minimize distance from vehicle/ Have unobstructed pathway to vehicle and collection points/ Mark tripping hazards with spray paint, cones, or caution tape/ Observe good housekeeping procedures
92. Measure vapor content and depth to bottom of hole	1. Chemical atmosphere hazard (vapors)	1. Monitor air, vapors with Photo-ionization detector (PID)/ Keep face away from opening of hole while collecting measurements
93. Set-up of shroud and sampling canister system	1. Hand injuries 2. Chemical atmosphere hazard (vapors) 3. Slips/Trips/Falls	1. Wear proper PPE (leather gloves, nitrile gloves)/ Keep fingers away from pinch points when installing pump/ Do not use open blades, use tubing cutter 2. Monitor air, vapors with Photo-ionization detector (PID)/ Keep face away from opening of hole while collecting measurements 3. Minimize distance from vehicle/ Have unobstructed pathway to vehicle and collection points/ Mark tripping hazards with spray paint, cones, or caution tape/ Observe good housekeeping procedures
94. Purge soil gas	1. Chemical atmosphere hazard (vapors)	1. Monitor air, vapors with Photo-ionization detector (PID)/ Keep face away from exhaust port of pump
95. Sample collection (opening and closing valves)	1. Hand injuries	1. Wear proper PPE (leather gloves)/ Keep fingers away from pinch points
96. Sealing sampling holes	1. Back injuries 2. Concrete dust 3. Eye injuries	1. Use proper lifting techniques for lifting of cement bags 2. Wear proper PPE (dust mask) 3. Wear proper PPE (safety glasses)
97. All activities	116. Slips/ Trips/ Falls 117. Hand injuries, cuts or lacerations during manual handling of materials 118. Foot injuries 119. Back injuries 120. Traffic 121. Wildlife: Stray animals, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 122. High Noise levels 123. Overhead hazards 124. Heat or cold injuries 125. Eye Injuries	123. Be aware of potential trip hazards/ Follow good housekeeping procedures/ Mark significant hazards 124. Inspect for jagged/sharp edges, and rough or slippery surfaces/ Keep fingers away from pinch points/ Wipe off greasy, wet, slippery or dirty objects before handling/ Wear leather/ cut-resistant gloves Wear proper PPE (Langan approved safety shoes) 125. Use proper lifting techniques/ Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift/ Obtain assistance when possible 126. Wear high visibility clothing & vest/ Use cones or signs to designate work area 127. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray animals/ Carry and use animal repellant when needed/ Use bug spray when needed 128. Wear hearing protection 129. Wear hard hat/ Avoid areas were overhead hazards exist. 130. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather)/ Drink plenty of fluids to avoid dehydration/ Takes breaks as necessary to avoid heat/cold stress 131. Wear safety glasses

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Indoor Air Sampling
JSA Number: JSA007-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: PID, Respiratory Protection (if necessary)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
98. Building walkthrough and background contaminant removal	50. Slips / Trips/ Falls 51. Exposure to substances/vapors during removal	11. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint 12. Monitor indoor air concentrations with a PID / Wear proper PPE (nitrile gloves) / Wear proper respiratory protection if necessary
99. Transport equipment to work area	16. Back Strain 17. Slips/ Trips/ Falls 18. Traffic 19. Cuts/abrasions from equipment 20. Contusions from dropped equipment	16. Use proper lifting techniques / Use wheeled transport 17. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 18. Wear proper PPE (high visibility vest or clothing) 19. Wear proper PPE (leather gloves, long sleeves) 20. Wear proper PPE (safety shoes)
100. Mark out areas for indoor air sampling	46. Slips/ Trips/ Falls	16. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e. holes, trenches) with safety cones or spray paint
101. Set-up canisters and begin indoor air sampling	37. Dropping crates or canisters 38. Pinch hazard	17. Exercise caution when moving crates and canisters / Use proper housekeeping of materials during sample events / Do not carry too many items at one time / Perform several trips, if necessary 18. Wear proper PPE (leather gloves)
102. Sample collection	4. Dropping crates or canisters 5. Pinched fingers from opening valves	4. Exercise caution when moving crates and canisters / Use proper housekeeping of materials during sample events / Do not carry too many items at one time / Perform several trips, if necessary 5. Wear proper PPE (leather gloves) / Keep fingers away from pinch points
103. Pack up equipment	3. Back strain	3. Use proper lifting techniques / Use wheeled transport

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	4. Slips/ Trips/ Falls 5. Traffic	4. Be aware of potential trip hazards / Follow good housekeeping procedures / Minimize distance to vehicle 5. Wear proper PPE (safety vest)
104. All activities	126. Slips/ Trips/ Falls 127. Hand injuries, cuts or lacerations during manual handling of materials 128. Foot injuries 129. Back injuries 130. Traffic 131. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 132. High Noise levels 133. Overhead hazards 134. Heat Stress/ Cold Stress 135. Eye Injuries	132. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 133. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 134. Wear Langan approved safety shoes 135. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 136. Wear high visibility clothing & vest / Use cones or signs to designate work area 137. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 138. Wear hearing protection 139. Wear hard hat / Avoid areas were overhead hazards exist. 140. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 141. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Geotechnical Drilling
JSA Number: JSA014-01

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last-Minute Risk Assessment.



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E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task / **Stop** & regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: NomeX (as needed)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
105. Transport equipment to work area	52. Back Strain 53. Slips/ Trips/ Falls 54. Traffic 55. Cuts/abrasions from equipment 56. Contusions from dropped equipment	13. Use proper lifting techniques / Use wheeled transport. 14. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures. 15. Wear proper PPE (high visibility vest or clothing) 16. Wear proper PPE (leather gloves, long sleeves) 17. Wear proper PPE (safety shoes)
106. Set-up HSA/SPT rig	47. Slips/ Trips/ Falls 48. Pinch Hazards 49. High noise levels 50. Clothing entanglement 51. Electrocution/falling equipment and debris from raising HSA/SPT rig mast. 52. Carbon monoxide poisoning 53. HSA/SPT rig roll-over 54. HSA/SPT rig movement	17. Be aware of potential trip hazards / Follow good housekeeping procedures / Mark significant below-grade hazards (i.e., holes, trenches) with safety cones or spray paint 18. Wear proper PPE (leather gloves) 19. Wear proper PPE (hearing protection) 20. Wear proper attire for HSA/SPT rig (no loose clothing, strings, etc.) 21. Wear proper PPE (hard hats) / Be aware of locations at all times / Look up, down and around before raising mast / Check HSA/SPT drill rig mast for loose objects/debris before raising 22. Stand upwind of rig engine 23. Do not move rig with mast raised / Set stabilizers prior to raising mast / Inspect work area / If area appears unstable, the boring locations should be moved. 24. All field personnel should stay clear of rig while moving / Use a spotter when backing up the rig
107. Advance HSA/SPT rods, augers, and casing below ground surface	39. Strain wrist/bruise palm 40. Pinched fingers 41. Back strain	19. Wear proper PPE (leather gloves) / Use proper technique for preparing rods / Use second person, if necessary 20. Wear proper PPE (leather gloves)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
108. Advance HSA/SPT rods, augers, and casing below ground surface (cont'd)	42. Clothing entanglement 43. Carbon monoxide poisoning 44. Bruised/Broken toes/feet 45. High noise levels	21. Use proper lifting techniques / Obtain assistance if needed 22. Wear proper attire for HSA/SPT rig (no loose clothing, strings, etc.) 23. Stand upwind of the rig 24. Wear proper PPE (safety shoes) 25. Wear proper PPE (hearing protection)
109. Remove and open split spoon	18. Pinched fingers 19. Cuts/lacerations 20. Skin contact with contaminated soil and groundwater	1. Wear proper PPE (nitrile and leather gloves) 2. Wear proper PPE (leather gloves) 3. Wear proper PPE (nitrile gloves, safety glasses)
110. Repeat steps 3 and 4 until desired depth is reached	1. See steps 3 and 4	1. See steps 3 and 4
111. Remove HSA/SPT rods, augers and casing and place in storage rack	1. Clothing entanglement 2. Back strain 3. Pinched fingers 4. Carbon monoxide poisoning 5. High noise levels	1. Wear proper attire for HSA/SPT rig (no loose clothing, strings, etc.) 2. Use proper lifting techniques / Obtain assistance if needed 3. Wear proper PPE (leather gloves) 4. Stand upwind of rig engine 5. Wear proper PPE (hearing protection)
112. Tremie-grout borehole with a cement-bentonite grout mixture	1. Splash cement/bentonite grout on face/eyes 2. Back strain 3. Pinched fingers	1. Wear proper PPE (safety glasses) 2. Use proper lifting techniques / Obtain assistance if needed 3. Wear proper PPE (nitrile gloves, leather gloves)
113. Decontaminate equipment	1. Contact with potentially impacted material 2. Contact with sharp pieces of equipment	1. Wear proper PPE (safety glasses, nitrile gloves) 2. Wear proper PPE (leather gloves)
114. Patch soil boring location to return to pre-existing conditions (i.e. concrete, asphalt, grass)	1. Cuts/lacerations 2. Splashed concrete on face/eyes 3. Hammer fingers/hands when patching asphalt	1. Wear proper PPE (leather gloves) / Use scissors for cutting 2. Use proper PPE (safety glasses) 3. Be aware of hands/fingers during hammering / Wear proper PPE (leather gloves)
115. All activities	136. Slips/ Trips/ Falls 137. Hand injuries, cuts, or lacerations during manual handling of materials 138. Foot injuries 139. Back injuries 140. Traffic 141. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 142. High Noise levels 143. Overhead hazards 144. Heat Stress/ Cold Stress 145. Eye Injuries	142. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 143. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 144. Wear Langan approved safety shoes 145. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 146. Wear high visibility clothing & vest / Use cones or signs to designate work area 147. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed 148. Wear hearing protection 149. Wear hard hat / Avoid areas were overhead hazards exist.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
		150. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress 151. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: **Test Pits**
JSA Number: **JSA016-01**

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☐ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
116. Transport equipment to work area	57. Back Strain 58. Slips/ Trips/ Falls 59. Traffic 60. Cuts/abrasions from equipment 61. Contusions from dropped equipment	18. Use proper lifting techniques / Use wheeled transport 19. Minimize distance to work area / Have unobstructed path to work area / Follow good housekeeping procedures 20. Wear proper PPE (high visibility vest or clothing) 21. Wear proper PPE (leather gloves, long sleeves) 22. Wear proper PPE (safety shoes)
117. Digging Test Pit	55. Back Strain 56. Unstable walls of excavation	25. Observe proper digging technique. Ensure spoil pile and equipment are at least 2 feet from edge of excavation. 26. Excavate test pit in a stepped manor.
118. All activities	146. Slips/ Trips/ Falls 147. Hand injuries, cuts, or lacerations during manual handling of materials 148. Foot injuries 149. Back injuries 150. Traffic 151. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 152. High Noise levels 153. Overhead hazards 154. Heat Stress/ Cold Stress 155. Eye Injuries	152. Be aware of potential trip hazards / Follow good housekeeping procedures/ Mark significant hazards 153. Inspect for jagged/sharp edges, and rough or slippery surfaces / Keep fingers away from pinch points / Wipe off greasy, wet, slippery or dirty objects before handling / Wear leather/ cut-resistant gloves 154. Wear Langan approved safety shoes 155. Use proper lifting techniques / Consider load location, task repetition, and load weigh when evaluating what is safe or unsafe to lift / Obtain assistance when possible 156. Wear high visibility clothing & vest / Use cones or signs to designate work area 157. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs / Carry/use dog/animal repellant / Use bug spray when needed.

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
3. All activities (cont'd)		158. Wear hearing protection 159. Wear hard hat / Avoid areas where overhead hazards exist. 160. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather) / Drink plenty of fluids to avoid dehydration / Takes breaks as necessary to avoid heat/cold stress. 161. Wear safety glasses
Additional items.		
Additional Items identified while in the field. (Delete row if not needed.)		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Sampling from Open Pit
JSA Number: JSA068

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – *Stop,* what has changed?
T – *Think* about the task
E – *Evaluate* potential hazards
P – *Plan* safe approach
S - *Start* task / *Stop* & regroup

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☐ Hearing Protection
☒ Safety Glasses	☐ Safety Goggles	☐ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☒ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☐ Traffic Cones/Signs	☐ Life Vest/Jacket	
☐ Other:				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
119. Transport equipment to work area	62. Back strains 63. Slips/Trips/ Falls 64. Traffic 65. Cuts/Abrasions/Contusions from equipment 66. Driving terrain/road hazards	38. Use proper lifting techniques/Use wheeled transport 39. Minimize distance to work area/ Have unobstructed path to work area/ Follow good housekeeping procedures. 40. Wear proper PPE (high-visibilty vest or clothing) 41. Wear proper PPE (leather gloves, long sleeves, Langan approved safety shoes) 42. Safety belts/ Be aware of road and weather conditions/watch when exiting vehicle
120. Walk from vehicle to sample locations	57. Slips/Trips/Falls 58. Back strains	36. Minimize distance to work area/ have unobstructed path to work area/ Follow good housekeeping procedures/ Locate safest access point/ Mark significant hazards with spray paint or cones/ Carry equipment in a way that it allows you to see walking path. 37. Use proper lifting techniques/Use wheeled transport/ Obtain assistance when needed
121. Excavation	46. Excavation collapse 47. Confined space 48. Soil	21. Use proper shoring/benching/sloping techniques; Ladder is properly situated in excavation; no water in excavation; competent person has inspected excavation prior to allow employees to enter. 22. Langan employees are not authorized to enter a confined space; 23. Soil and equipment are kept at least 2 feet from edge of excavation
122. Surface Water Sampling	1. Contaminated media. Skin/eye contact with biological agents and/or chemicals.	1. Wear appropriate PPE (Safety glasses, appropriate gloves). Review SDS for all chemicals present.
123. Sample Collection (Water)	1. Drowning Hazards	1. Use buddy system/ Wear flotation vest if water is deeper than 2 feet or swift moving/ Select working area with stable footing/ Do not attempt to

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
	2. Chemical burns (when adding acid preservative to sample) 3. Back Strains 4. Ergonomic issues 5. Slip/Trips/Falls	cross or stand in swift moving water. Ensure fall protection harness is secure and working properly. 2. Wear proper PPE (Nitrile gloves, Tyvek Sleeves) 3. Do not over-tighten bottle caps / Handle bottles safely to avoid breakage / Wrap glass bottles in bubble wrap, if possible 4. Use proper lifting techniques/ Use wheeled transport/ Obtain assistance where and when needed/ Consider load weight when evaluating what is safe or unsafe to carry. 5. When possible, avoid bending over for long periods of time/ Use a small stool for sitting or knee pad for kneeling. 6. Minimize distance to sample area/ Plan route and check surface prior to carrying heavy equipment/ Locate safest access point/ Follow good housekeeping procedures/ Mark significant below grade hazards (holes, trenches) with spray paint or cones/ Wear foot protection with ankle support and gripping soles/ Avoid standing water or slippery terrain.
124. Icing of Samples & Transporting coolers/equipment from work area.	5. Back Strains 6. Slips/Trips/Falls 7. Cuts/Abrasions from equipment 8. Pinch/Crushing Hazards. 6.	5. Drain coolers of water. Use proper lifting techniques. Use wheeled transport whenever possible; 6. Plan for and utilize a safe and unobstructed path of travel to and from work area. Maintain situational awareness when traveling to and from work area; 7. Wear proper PPE (Leather gloves, long sleeves); 7. Wear proper PPE (Leather gloves, long sleeves, hard hat, Langan approved safety shoes).
125. All activities	156. Slips/ Trips/ Falls 157. Hand injuries, cuts or lacerations during manual handling of materials 158. Foot injuries 159. Back injuries 160. Traffic 161. Wildlife: Stray dogs, Mice/rats, Vectors (i.e. mosquitoes, bees, etc.) 162. High Noise levels 163. Overhead hazards 164. Heat Stress/ Cold Stress 165. Eye Injuries	162. Be aware of potential trip hazards/ Follow good housekeeping procedures/ Mark significant hazards 163. Inspect for jagged/sharp edges, and rough or slippery surfaces/ Keep fingers away from pinch points/ Wipe off greasy, wet, slippery or dirty objects before handling/ Wear leather/ Cut-resistant gloves 164. Wear proper PPE (Langan approved safety shoes). 165. Use proper lifting techniques/ Consider load location, task repetition, and load weight when evaluating what is safe or unsafe to lift/ Obtain assistance when possible. 166. Wear high visibility clothing & vest/ Use cones or signs to designate work area 167. Be aware of surroundings at all times, including the presence of wildlife/ Do not approach stray dogs/ Carry and use animal repellant when needed/ Use bug spray when needed 168. Wear proper PPE (hearing protection) 169. Wear hard hat/ Avoid areas were overhead hazards exist. 170. Wear proper attire for weather conditions (sunscreen or protective clothing in sunlight, layers for cold weather)/ Drink plenty of fluids to avoid dehydration/ Takes breaks as necessary to avoid heat/cold stress 171. Wear proper PPE (safety glasses)

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
Additional items.		
Additional Items identified while in the field.		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		

LANGAN

Job Safety Analysis (JSA)
Health and Safety

JSA Title: Soft Dig - Air Knife, Vac Truck, Slide Hammer, Hand Auger and Borehole Triangulation
JSA Number: JSA073

A Job Safety Analysis (JSA) must identify all job steps required to complete the task, the potential hazards employees could be exposed to while performing the job step and the preventative/corrective actions required to reduce/mitigate the identified potential hazards. Employees must certify that they have either prepared the JSA or have reviewed the JSA and are aware of the potential hazards associated with this task and will follow the provided preventive/corrective actions. Prior to the start of any work "TAKE 5" and conduct a Last Minute Risk Assessment.



S – ***Stop,*** *what has changed?*
T – ***Think*** *about the task*
E – ***Evaluate*** *potential hazards*
P – ***Plan*** *safe approach*
S - ***Start*** *task /* ***Stop*** *& regroup*

PERSONAL PROTECTIVE EQUIPMENT (Required or to be worn as needed):				
☒ Safety Shoes	☒ Long Sleeves	☒ Safety Vest (Class 2)	☒ Hard Hat	☒ Hearing Protection
☒ Safety Glasses	☒ Safety Goggles	☒ Face Shield	☒ Nitrile Gloves	☐ PVC Gloves
☒ Leather Gloves	☐ Cut Resist. Gloves	☐ Fall Protection	☐ Fire Resistant Clothing	☐ Rubber Boots
☐ Insect/Animal Repellent	☐ Ivy Blocker/Cleaner	☒ Traffic Cones/Signs	☐ Life Vest/Jacket	
☒ Other: Half-face respirator, dust cartridges, and PID (if applicable)				

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
126. Pre-work safety meeting	67. Improper communication	43. Ensure all paperwork is ready for project 44. Ensure all personnel have read and understand the work plan, reviewed HASP, and applicable JSAs
127. Equipment Preparation	59. Slips/ Trips/ Falls 60. Physical hazards including strains and hand injury 61. Traffic	1. Be alert / Follow good housekeeping procedures 2. Use proper lifting techniques / Do not lift heavy loads without assitance / Avoid putting hands near pinch points / Wear proper PPE (leather gloves). 3. Use cones, signs, flags or other traffic control devices
3. Air Knife	49. Motion – Heavy Equipment Movement 50. High noise levels 51. Airborne particles and debris 52. Impact to subsurface lines	24. Do not allow personnel to stand within the swing radius of equipment, arms/booms, when equipment is in use; Stay clear of operating equipment when in motion; When approaching equipment, approach should be made from the front ensuring eye contact is made with operator. 25. Wear hearing protection required when working around operating equipment if levels are suspected to be >85 dBA 26. Use water as necessary to control dust in area; Use containment unit to contain particles and dust; PPE to include face shield or safety glasses with side shields, dust mask. 27. Verify underground features have been marked and points are 5' or greater from identified features; Ensure excavation is approved by competent person

JOB STEPS	POTENTIAL HAZARDS	PREVENTATIVE / CORRECTIVE ACTION
4. Vaccuum Truck Extraction	1. Pre-truck inspection 2. High noise levels 3. Physical hazards including back strain and hand injury	1. Inspect the vehicle and all associated equipment prior to operating the vaccuum. Ensure all hoses and connections are properly secured. 2. Wear hearing protection required when working around operating equipment if levels are suspected to be >85 dBA 3. Hold Vacuum hose using arms and shoulders. Do not over exert, keep back in neutral position, bend at knees. Request assistance when needed. Ensure proper PPE is worn at all times, including a face shield.
5. Slide Hammer	1. Physical hazards including back strain and Hand or eye injury 2. Impact to subsurface lines	1. Hold slide hammer using arms and shoulders. Apply force to slide hammer without over exerting. Keep away from slide hammer recoil. Keep back in neutral position and bend at the knees. Request assistance when needed. Ensure proper PPE is worn at all times, including eye glasses with side shields. 2. Verify underground features have been marked and points are 5' or greater from identified features; Ensure excavation is approved by competent person
6. Hand Auger and/or Shovel (if applicable)	172. Physical hazards including back strain and hand injury	1. Twist hand auger using arms and shoulders. Operate shovel using arms and legs. Do not over exert, Keep back in neutral position, bend at the knees. Request assistance when needed. Remove auger or shovel from ground keeping back in neutral position and lift using legs.
7. Borehole Triangulation (using any combination of the aforementioned job steps, as needed)	1. Inconclusive subsurface utility line clearance	1. Verify underground features have been marked and points are 5' or greater from identified features; Ensure excavation is approved by competent person
Additional items.		

Print Name	Sign Name	Date
Prepared by:		
Reviewed by:		
Ken Bloom		9/24/2025

ATTACHMENT H

TAILGATE SAFETY BRIEFING FORM

LANGAN TAILGATE SAFETY BRIEFING

Date:_____ Time: _____

Leader:_____ Location:_____

Work Task:

_____

_____

SAFETY TOPICS (*provide some detail of discussion points*)

Chemical Exposure Hazards and Control:_____

_____

Physical Hazards and Control: _____

Air Monitoring: _____

PPE: _____

_____

Communications:_____

Safe Work Practices: _____

_____

Emergency Response: _____

Hospital/Medical Center Location: _____

Phone Nos.: _____

Other: _____

FOR FOLLOW-UP (the issues, responsibilities, due dates, etc.**)**

_____

_____

_____

ATTENDEES

PRINT NAME	COMPANY	SIGNATURE

APPENDIX C

Community Air Monitoring Plan

New York State Department of Health Generic Community Air Monitoring Plan

A Community Air Monitoring Plan (CAMP) requires real-time monitoring for volatile organic compounds (VOCs) and particulates (i.e., dust) at the downwind perimeter of each designated work area and when certain activities are in progress at contaminated sites. The CAMP is not intended for use in establishing action levels for worker respiratory protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of investigative and remedial work activities. The action levels specified herein require increased monitoring, corrective actions to abate emissions, and/or work shutdown. Additionally, the CAMP helps to confirm that work activities did not spread contamination off-site through the air.

The generic CAMP presented below will be sufficient to cover many, if not most, sites. Specific requirements should be reviewed for each situation in consultation with NYSDOH to ensure proper applicability. In some cases, a separate site-specific CAMP or supplement may be required. Depending upon the nature of contamination, chemical specific monitoring with appropriately-sensitive methods may be required. Depending upon the proximity of potentially exposed individuals, more stringent monitoring or response levels than those presented below may be required. Special requirements will be necessary for work within 20 feet of potentially exposed individuals or structures and for indoor work with co-located residences or facilities. These requirements should be determined in consultation with NYSDOH.

Reliance on the CAMP should not preclude simple, common-sense measures to keep VOCs, dust, and odors at a minimum around the work areas.

Community Air Monitoring Plan

Depending upon the nature of known or potential contaminants at each site, real-time air monitoring for volatile organic compounds (VOCs) and/or particulate levels at the perimeter of the exclusion zone or work area will be necessary. Most sites will involve VOC and particulate monitoring; sites known to be contaminated with heavy metals alone may only require particulate monitoring. If radiological contamination is a concern, additional monitoring requirements may be necessary per consultation with appropriate NYSDEC/NYSDOH staff.

Continuous monitoring will be required for all ground intrusive activities and during the demolition of contaminated or potentially contaminated structures. Ground intrusive activities include, but are not limited to, soil/waste excavation and handling, test pitting or trenching, and the installation of soil borings or monitoring wells.

Periodic monitoring for VOCs will be required during non-intrusive activities such as the collection of soil and sediment samples or the collection of groundwater samples from existing monitoring wells. “Periodic” monitoring during sample collection might reasonably consist of taking a reading upon arrival at a sample location, monitoring while opening a well cap or overturning soil, monitoring during well baling/purging, and taking a reading prior to leaving a sample location. In some instances, depending upon the proximity of potentially exposed individuals, continuous monitoring may be required during sampling activities. Examples of such situations include groundwater sampling at wells on the curb of a busy urban street, in the midst of a public park, or adjacent to a school or residence.

VOC Monitoring, Response Levels, and Actions

Volatile organic compounds (VOCs) must be monitored at the downwind perimeter of the immediate work area (i.e., the exclusion zone) on a **continuous** bases or as otherwise specified. Upwind concentrations should be measured at the start of each workday and periodically thereafter to establish background conditions. The monitoring work should be performed using equipment appropriate to measure the types

of contaminants known or suspected to be present. The equipment should be calibrated at least daily for the contaminant(s) of concern or for an appropriate surrogate. The equipment should be capable of calculating 15-minute running average concentrations, which will be compared to the levels specified below.

- If the ambient air concentration of total organic vapors at the downwind perimeter of the work area or exclusion zone exceeds 5 parts per million (ppm) above background for the 15-minute average, work activities must be temporarily halted and monitoring continued. If the total organic vapor level readily decreases (per instantaneous readings) below 5 ppm over background, work activities can resume with continued monitoring.

- If total organic vapor levels at the downwind perimeter of the work area or exclusion zone persist at levels in excess of 5 ppm over background but less than 25 ppm, work activities must be halted, the source of vapors identified, corrective actions taken to abate emissions, and monitoring continued. After these steps, work activities can resume provided that the total organic vapor level 200 feet downwind of the exclusion zone or half the distance to the nearest potential receptor or residential/commercial structure, whichever is less – but in no case less than 20 feet, is below 5 ppm over background for the 15-minute average.

- If the organic vapor level is above 25 ppm at the perimeter of the work area, activities must be shutdown.

All 15-minute readings must be recorded and available for State (DEC and DOH) personnel to review. Instantaneous readings, if any, used for decision purposes should also be recorded.

Particulate Monitoring, Response Levels, and Actions

Particulate concentrations should be monitored **continuously** at the upwind and downwind perimeters of the exclusion zone at temporary particulate monitoring stations. The particulate monitoring should be performed using real-time monitoring equipment capable of measuring particulate matter less than 10 micrometers in size (PM-10) and capable of integrating over a period of 15 minutes (or less) for comparison to the airborne particulate action level. The equipment must be equipped with an audible alarm to indicate exceedance of the action level. In addition, fugitive dust migration should be visually assessed during all work activities.

- If the downwind PM-10 particulate level is 100 micrograms per cubic meter (mcg/m3) greater than background (upwind perimeter) for the 15-minute period or if airborne dust is observed leaving the work area, then dust suppression techniques must be employed. Work may continue with dust suppression techniques provided that downwind PM-10 particulate levels do not exceed 150 mcg/m3 above the upwind level and provided that no visible dust is migrating from the work area.

- If, after implementation of dust suppression techniques, downwind PM-10 particulate levels are greater than 150 mcg/m3 above the upwind level, work must be stopped and a re-evaluation of activities initiated. Work can resume provided that dust suppression measures and other controls are successful in reducing the downwind PM-10 particulate concentration to within 150 mcg/m3 of the upwind level and in preventing visible dust migration.

All readings must be recorded and be available for State (DEC and DOH) personnel to review.

Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures
When work areas are within 20 feet of potentially exposed populations or occupied structures, the continuous monitoring locations for VOCs and particulates must reflect the nearest potentially exposed individuals and the location of ventilation system intakes for nearby structures. The use of engineering controls such as vapor/dust barriers, temporary negative-pressure enclosures, or special ventilation devices should be considered to prevent exposures related to the work activities and to control dust and odors. Consideration should be given to implementing the planned activities when potentially exposed populations are at a minimum, such as during weekends or evening hours in non-residential settings.

- If total VOC concentrations opposite the walls of occupied structures or next to intake vents exceed 1 ppm, monitoring should occur within the occupied structure(s). Depending upon the nature of contamination, chemical-specific colorimetric tubes of sufficient sensitivity may be necessary for comparing the exposure point concentrations with appropriate pre-determined response levels (response actions should also be pre- determined). Background readings in the occupied spaces must be taken prior to commencement of the planned work. Any unusual background readings should be discussed with NYSDOH prior to commencement of the work.

- If total particulate concentrations opposite the walls of occupied structures or next to intake vents exceed 150 mcg/m3, work activities should be suspended until controls are implemented and are successful in reducing the total particulate concentration to 150 mcg/m3 or less at the monitoring point.

- Depending upon the nature of contamination and remedial activities, other parameters (e.g., explosivity, oxygen, hydrogen sulfide, carbon monoxide) may also need to be monitored. Response levels and actions should be pre-determined, as necessary, for each site.

Special Requirements for Indoor Work With Co-Located Residences or Facilities
Unless a self-contained, negative-pressure enclosure with proper emission controls will encompass the work area, all individuals not directly involved with the planned work must be absent from the room in which the work will occur. Monitoring requirements shall be as stated above under “Special Requirements for Work Within 20 Feet of Potentially Exposed Individuals or Structures” except that in this instance “nearby/occupied structures” would be adjacent occupied rooms. Additionally, the location of all exhaust vents in the room and their discharge points, as well as potential vapor pathways (openings conduits, etc.) relative to adjoining rooms, should be understood and the monitoring locations established accordingly. In these situations, it is strongly recommended that exhaust fans or other engineering controls be used to create negative air pressure within the work area during remedial activities. Additionally, it is strongly recommended that the planned work be implemented during hours (e.g. weekends or evenings) when building occupancy is at a minimum.

APPENDIX D

Quality Assurance Project Plan

QUALITY ASSURANCE PROJECT PLAN

for

BRONX KINGSBRIDGE ARMORY SITE
1 West Kingsbridge Road
Block 3247, Lot 10
Bronx, New York

Prepared For:

8th Regiment Partners LLC
600 Third Avenue, 18th Floor
New York, NY 10016

Prepared by:

Langan Engineering, Environmental, Surveying,
Landscape Architecture and Geology, D.P.C.
368 Ninth Avenue, 8th Floor
New York, New York 10001

June 2026
Langan Project No. 170900201

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1.0 PROJECT DESCRIPTION

1.1 INTRODUCTION

This Quality Assurance Project Plan (QAPP) was prepared on behalf of 8th Regiment Partners LLC (the Applicant), for the Bronx Kingsbridge Armory Site at 1 West Kingsbridge Road (Bronx County Tax Block 3247, Lot 10) in Bronx, New York (the "site"). This QAPP supports the Remedial Investigation Work Plan (RIWP) submitted to the New York State Department of Environmental Conservation (NYSDEC) to provide sufficient information for evaluation of remedial alternatives and development of a conceptual site model.

This QAPP specifies analytical methods to be used to ensure that data collected during the Remedial Investigation (RI) are precise, accurate, representative, comparable, complete, and meet the sensitivity requirements of the project.

1.2 PROJECT OBJECTIVES

The objective of the Remedial Investigation (RI) is to investigate and characterize the nature and extent of environmental impacts at the site and to provide sufficient information to evaluate remedial alternatives and threats to human health and the environment. This QAPP addresses sampling and analytical methods that may be necessary in support of the RIWP. These objectives have been established in order to meet standards that will protect public health and the environment.

1.3 SCOPE OF WORK

The scope of work covered in this QAPP is detailed in the RIWP. In general, the RIWP proposes soil boring installation and sampling, groundwater monitoring well installation and sampling, and soil vapor point and sub-slab vapor point installation and sampling.

The following investigation activities will be performed as part of the RIWP:

3.1 Geophysical Survey

- Completion of a site-wide geophysical survey to clear sample locations and identify potential subsurface utilities and structures, including USTs. Sample locations may be relocated as necessary, based on the findings of the geophysical survey and other available utility information.

Soil Boring Advancement and Sampling

- Advancement of 25 soil borings throughout the site to about 35 feet below sidewalk grade (about 23 feet below basement grade) with a track-mounted Geoprobe and/or Sonic drill rig at soil boring locations. Soil borings to be converted to groundwater

monitoring wells will be advanced to at least 5 feet below the observed groundwater interface.

- Collection of up to three samples from each of the 25 soil borings (plus quality assurance/quality control [QA/QC] samples) for laboratory analysis. Samples for laboratory analysis will be collected from within non-native fill, terminus of fill, and at the groundwater interface. If petroleum-like impacts are observed, additional samples may be collected.

- Re-advancement of 14 soil borings in the same locations as the previous 2007 and 2013 soil borings where total and TCLP lead were detected at concentrations above the applicable criteria and advancement of up to 49 delineation soil borings positioned throughout the remainder of the former rifle and pistol ranges in the basement of the armory building to attempt vertical and horizontal delineation of lead hazardous soil.

- Collection of up to four samples from each of the soil boring locations for vertical delineation of hazardous lead-impacted soil and laboratory analysis. The samples will be collected from the 0 to 1-foot, 1- to 2-foot, 2- to 3-foot, and 3- to 4-foot intervals.

Monitoring Well Installation and Sampling

- Installation of 10 permanent groundwater monitoring wells.

- Development of groundwater monitoring wells by surging and pumping upon installation.

- Collection of one groundwater sample from each monitoring well (plus quality QA/QC samples) for laboratory analysis.

- Surveying and gauging the monitoring wells to measure groundwater elevation and evaluate flow direction.

Soil Vapor Sampling

- Installation of four sub-surface soil vapor points to about 5 feet bsg or 2 feet above groundwater (whichever is shallower) in the exterior parts of the site.

- Installation of 13 sub-slab vapor points immediately below the basement slab.

- Collection of 13 indoor air samples co-located with the sub-slab vapor point locations.

- Collection of one outdoor ambient air sample.

2.0 DATA QUALITY OBJECTIVES AND PROCESS

Data Quality Objectives (DQO) are qualitative and quantitative statements to help ensure that data of known and appropriate quality are obtained during the project. The overall objective is to investigate subsurface conditions at and emanating from the site and to provide sufficient information for evaluation of remedial alternatives and development of a conceptual site model.

The DQO process is an iterative process where various options for implementing a project are explored, dissected, and recombined. The feasibility and costs of various options are estimated, and then the most advantageous option is selected and developed into project work plans that will be implemented.

DQOs for sampling activities are determined by evaluating five factors:

- Data needs and uses: The types of data required and how the data will be used after it is obtained.
- Parameters of Interest: The types of chemical or physical parameters required for the intended use.
- Level of Concern: Levels of constituents, which may require remedial actions or further investigations, based on comparison to Title 6 of the Official Compilation of New York Codes, Rules and Regulations Part 375 NYSDEC Restricted-Use Commercial (RUC) Soil Cleanup Objectives (SCOs) for soil samples, the Part 375 NYSDEC Protection of Groundwater (PGW) criteria for groundwater samples, and to the October 2006 (updated in May 2017) NYSDOH Guidance for Evaluating Soil Vapor Intrusion in the State of New York Air Guideline Values and Decision Matrices for soil vapor samples.
- Required Analytical Level: The level of data quality, data precision, and QA/QC documentation required for chemical analysis.
- Required Detection Limits: The detection limits necessary based on the above information.

The investigation will be evaluated using the DQO process on an individual, task-specific basis. DQOs and the required level of review will be determined during this process.

The quality assurance and quality control objectives for all measurement data include:

- **Precision** – an expression of the reproducibility of measurements of the same parameter under a given set of conditions. Field sampling precision will be determined by analyzing field duplicate samples and analytical precision will be

determined by analyzing laboratory duplicates, laboratory control sample duplicates, and/or matrix spike duplicates.

- **Accuracy** – a measure of the degree of agreement of a measured value with the true or expected value of the quantity of concern. For soil and groundwater samples, accuracy will be determined through the assessment of the analytical results of field blanks and trip blanks for each sample set. Analytical accuracy will be assessed by examining the percent recoveries of surrogate compounds that are added to each sample (organic analyses only), internal standards, laboratory method blanks, instrument calibration, and the percent recoveries of matrix spike compounds added to selected samples and laboratory blanks. For soil vapor or air samples, analytical accuracy will be assessed by examining the percent recoveries that are added to each sample, internal standards, laboratory method blanks, and instrument calibration.
- **Representativeness** – expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is accomplished by following all applicable methods, laboratory-issued standard operating procedures (SOP), the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.
- **Completeness** – the percentage of measurements made which are judged to be valid. Completeness will be assessed through data validation. The QC objective for completeness is generation of valid data for at least 90 percent of the analyses requested.
- **Comparability** – expresses the degree of confidence with which one data set can be compared to another. The comparability of all data collected for this project will be ensured using several procedures, including standard methods for sampling and analysis as documented in the QAPP, using standard reporting units and reporting formats, and data validation.
- **Sensitivity** – the ability of the instrument or method to detect target analytes at the levels of interest. The project manager will select, with input from the

laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection.

3.0 PROJECT ORGANIZATION

Investigation activities will be overseen by Langan on behalf of the Applicant. Langan will perform the sampling collection as described in the RIWP and will subcontract drilling and analytical services. Langan will also arrange data analysis and reporting tasks. The analytical services will be performed by an NYSDOH Environmental Laboratory Accreditation Program (ELAP) certified laboratory. Data validation services will be performed by Joe Conboy of Langan.

Key contacts for this project are as follows:

8th Regiment Partners LLC:	Mr. Jorge Madruga
Engineer of Record, Qualified Environmental Professional (QEP), and Langan Quality Assurance Officer (QAO):	Mr. Paul McMahon, PE Telephone: (934) 237-1319
Langan Project Manager:	Ms. Kristen Wexler Telephone: (203) 784-3009
Langan Field Team Leader:	Mr. Connor Moore Telephone: (212) 479-5512
Langan Health and Safety Manager:	Mr. Tony Moffa, CHMM, COS, CSP Telephone: (215) 491-6500
Langan Health and Safety Officer (H&SO):	Mr. Bill Bohrer, PG Telephone: (410) 984-3068
Data Validator:	Mr. Joe Conboy Telephone: (602) 790-6052
Laboratory Representative:	TBD
Field Personnel:	TBD

Résumés are included in Attachment A of this QAPP.

4.0 QUALITY ASSURANCE OBJECTIVES FOR COLLECTION OF DATA

The overall quality assurance objective is to develop and implement procedures for sampling, laboratory analysis, field measurements, and reporting that will provide data of sufficient quality to evaluate the subsurface conditions on the site. The sample set, chemical analysis results, and interpretations must be based on data that meet or exceed quality assurance objectives established for the site. Quality assurance objectives are usually expressed in terms of accuracy or bias, sensitivity, completeness, representativeness, comparability, and sensitivity of analysis. Variances from the quality assurance objectives at any stage of the investigation will result in the implementation of appropriate corrective measures and an assessment of the impact of corrective measures on the usability of the data.

4.1 PRECISION

Precision is a measure of the degree to which two or more measurements are in agreement. Field precision is assessed through the collection and measurement of field duplicates. Laboratory precision and sample heterogeneity also contribute to the uncertainty of field duplicate measurements. This uncertainty is taken into account during the data assessment process. For field duplicates, results less than 5x the reporting limit (RL) meet the precision criteria if the absolute difference is less than ±2x the RL for soils (and ±1x the RL for water) and acceptable based on professional judgement. For results greater than 2x the RL for soils (and 1x the RL for water), the acceptance criteria is a relative percent difference (RPD) of ≤50% (soil), <30% (water and air). RLs and method detection limits (MDL) are provided in Attachment B.

Laboratory precision is assessed through the analysis of matrix spike/matrix spike duplicates (MS/MSD), laboratory control sample/laboratory control sample duplicates (LCS/LCSD) and subsequent calculation of RPD. For outliers, if additional sample volume is present, the MS/MSD should be reanalyzed and the RPD recomputed. If additional volume is not present, an evaluation will be performed to determine the extent of potential matrix interference.

4.2 ACCURACY

Accuracy is the measurement of the reproducibility of the sampling and analytical methodology. It should be noted that precise data may not be accurate data. For the purpose of this QAPP, bias is defined as the constant or systematic distortion of a measurement process, which manifests itself as a persistent positive or negative deviation from the known or true value. This may be due to (but not limited to) improper sample collection, sample matrix, poorly calibrated analytical or sampling equipment, or limitations or errors in analytical methods and techniques.

Accuracy in the field is assessed through the use of field and trip blanks and through compliance to all sample handling, preservation, and holding time requirements. All field and trip blanks should be non-detect when analyzed by the laboratory. Any contaminant detected in an associated field blank will be evaluated against laboratory blanks (preparation or method) and evaluated against field samples collected on the same day to determine potential for bias.

Laboratory accuracy is assessed by evaluating the percent recoveries of MS/MSD samples, LCS/LCSD, surrogate compound recoveries, internal standard area counts, initial and continuing calibration, and the results of method, initial and continuing calibration blanks. MS/MSD, LCS/LCSD, and surrogate percent recoveries will be compared to either method-specific control limits or laboratory-derived control limits. Sample volume permitting, samples displaying outliers should be reanalyzed. All associated method blanks should be non-detect when analyzed by the laboratory.

4.3 COMPLETENESS

Laboratory completeness is the ratio of total number of samples analyzed and verified as acceptable compared to the number of samples submitted to the fixed-base laboratory for analysis, expressed as a percent. Three measures of completeness are defined:

- Sampling completeness, defined as the number of valid samples collected relative to the number of samples planned for collection;
- Analytical completeness, defined as the number of valid sample measurements relative to the number of valid samples collected; and
- Overall completeness, defined as the number of valid sample measurements relative to the number of samples planned for collection.

Soil and groundwater data will meet a 90% completeness criterion. If the criterion is not met, sample results will be evaluated for trends in rejected and unusable data. The effect of unusable data required for a determination of compliance will also be evaluated.

4.4 REPRESENTATIVENESS

Representativeness expresses the degree to which data accurately and precisely represents a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition within a defined spatial and/or temporal boundary. Representativeness is dependent upon the adequate design of the sampling program and will be satisfied by ensuring that the scope of work is followed and that specified sampling and analysis techniques are used. This is performed by following applicable SOPs and this QAPP. All field technicians will be given copies of appropriate

documents prior to sampling events and are required to read, understand, and follow each document as it pertains to the tasks at hand.

Representativeness in the laboratory is ensured by compliance to nationally-recognized analytical methods, meeting sample holding times, and maintaining sample integrity while the samples are in the laboratory's possession. This is performed by following all applicable methods, laboratory-issued SOPs, the laboratory's Quality Assurance Manual, and this QAPP. The laboratory is required to be properly certified and accredited.

4.5 COMPARABILITY

Comparability is an expression of the confidence with which one data set can be compared to another. Comparability is dependent upon the proper design of the sampling program and will be satisfied by ensuring that the sampling plan is followed and that sampling is performed according to the SOPs or other project-specific procedures. Analytical data will be comparable when similar sampling and analytical methods are used as documented in the QAPP. Comparability will be controlled by requiring the use of specific nationally-recognized analytical methods and requiring consistent method performance criteria. Comparability is also dependent on similar quality assurance objectives. Previously collected data will be evaluated to determine whether they may be combined with contemporary data sets.

4.6 SENSITIVITY

Sensitivity is the ability of the instrument or method to detect target analytes at the levels of interest. The project director will select, with input from the laboratory and QA personnel, sampling and analytical procedures that achieve the required levels of detection and QC acceptance limits that meet established performance criteria. Concurrently, the project manager will select the level of data assessment to ensure that only data meeting the project DQOs are used in decision-making.

Field equipment will be used that can achieve the required levels of detection for analytical measurements in the field. In addition, the field sampling staff will collect and submit full volumes of samples as required by the laboratory for analysis, whenever possible. Full volume aliquots will help ensure achievement of the required limits of detection and allow for reanalysis if necessary. The concentration of the lowest level check standard in a multi-point calibration curve will represent the reporting limit.

Analytical methods and quality assurance parameters associated with the sampling program are presented in Attachment C. The frequency of associated field blanks, trip blanks and field duplicate samples will be based on the recommendations listed in DER-10, and as described in Section 5.3.

Site-specific MS and MSD samples will be prepared and analyzed by the analytical laboratory by spiking an aliquot of submitted sample volume with analytes of interest. Additional sample volume is not required by the laboratory for this purpose. An MS/MSD analysis will be analyzed at a rate of 1 out of every 20 samples, or one per analytical batch. MS/MSD samples are only required for soil and groundwater samples.

5.0 SAMPLE COLLECTION AND FIELD DATA ACQUISITION PROCEDURES

Soil and groundwater sampling will be conducted in accordance with the established NYSDEC protocols contained in DER-10/Technical Guidance for Site Investigation and Remediation (May 2010). Soil vapor sampling will be conducted in accordance with the established NYSDOH protocols contained in the Guidance for Evaluating Soil Vapor Intrusion in the State of New York (October 2006). The following sections describe procedures to be followed for specific tasks.

5.1 FIELD DOCUMENTATION PROCEDURES

Field documentation procedures will include summarizing field data in field books and field data sheets, and proper sample labeling. These procedures are described in the following sections.

5.1.1 Field Data and Notes

Field notebooks contain the documentary evidence regarding procedures conducted by field personnel. Hard cover, bound field notebooks will be used because of their compact size, durability, and secure page binding. The pages of the notebook will not be removed.

Entries will be made in waterproof, permanent blue or black ink. No erasures will be allowed. If an incorrect entry is made, the information will be crossed out with a single strike mark and the change initialed and dated by the team member making the change. Each entry will be dated. Entries will be legible and contain accurate and complete documentation of the individual or sampling team's activities or observations made. The level of detail will be sufficient to explain and reconstruct the activity conducted. Each entry will be signed by the person(s) making the entry.

The following types of information will be provided for each sampling task, as appropriate:

- Project name and number
- Reasons for being on-site or taking the sample
- Date and time of activity
- Sample identification numbers
- Geographical location of sampling points with references to the site, other facilities or a map coordinate system. Sketches will be made in the field logbook when appropriate
- Physical location of sampling locations such as depth below ground surface
- Description of the method of sampling including procedures followed, equipment used and any departure from the specified procedures

- Description of the sample including physical characteristics, odor, etc.
- Readings obtained from health and safety equipment
- Weather conditions at the time of sampling and previous meteorological events that may affect the representative nature of a sample
- Photographic information including a brief description of what was photographed, the date and time, the compass direction of the picture and the number of the picture on the camera
- Other pertinent observations such as the presence of other persons on the site, actions by others that may affect performance of site tasks, etc.
- Names of sampling personnel and signature of persons making entries

Field records will also be collected on field data sheets including boring logs, which will be used for geologic and drilling data during soil boring activities. Field data sheets will include the project-specific number and stored in the field project files when not in use. At the completion of the field activities, the field data sheets will be maintained in the central project file.

5.1.2 Sample Labeling

Each sample collected will be assigned a unique identification number in accordance with the sample nomenclature guidance included in Attachment D, and placed in an appropriate sample container. Each sample container will have a sample label affixed to the outside with the date and time of sample collection and project name. In addition, the label will contain the sample identification number, analysis required and chemical preservatives added, if any. All documentation will be completed in waterproof ink.

5.2 EQUIPMENT CALIBRATION AND PREVENTATIVE MAINTENANCE

A photoionization detector (PID) will be used during the sampling activities to evaluate work zone action levels, collect pre- and post-sample readings for air samples, screen soil samples, and collect monitoring well headspace readings. Field calibration and/or field checking of the PID will be the responsibility of the field team leader and the site H&SO, and will be accomplished by following the procedures outlined in the operating manual for the instrument. At a minimum, field calibration and/or field equipment checking will be performed once daily, prior to use. Field calibration will be documented in the field notebook. Entries made into the logbook regarding the status of field equipment will include the following information:

- Date and time of calibration
- Type of equipment serviced and identification number (such as serial number)

- Reference standard used for calibration
- Calibration and/or maintenance procedure used
- Other pertinent information

A water quality meter (YSI 6820 or similar) will be used during purging of groundwater to measure pH, specific conductance, temperature, dissolved oxygen, turbidity and oxidation-reduction-potential (ORP), every five minutes. A portable turbidity meter (LaMotte or similar) may also be used to measure turbidity. Water-quality meters should be calibrated and the results documented before use each day using standardized field calibration procedures and calibration checks.

Equipment that fails calibration or becomes inoperable during use will be removed from service and segregated to prevent inadvertent utilization. The equipment will be properly tagged to indicate that it is out of calibration. Such equipment will be repaired and recalibrated to the manufacturer's specifications by qualified personnel. Equipment that cannot be repaired will be replaced.

Off-site calibration and maintenance of field instruments will be conducted as appropriate throughout the duration of project activities. All field instrumentation, sampling equipment and accessories will be maintained in accordance with the manufacturer's recommendations and specifications and established field equipment practice. Off-site calibration and maintenance will be performed by qualified personnel. A logbook will be kept to document that established calibration and maintenance procedures have been followed. Documentation will include both scheduled and unscheduled maintenance.

5.3 SAMPLE COLLECTION

Soil Samples

Soil samples will be visually classified and field screened using a PID to assess potential impacts from volatile organic compounds (VOC) and for health and safety monitoring. Soil samples collected for analysis of VOCs will be collected using either EnCore® or Terra Core® sampling equipment. For analysis of non-volatile parameters, samples will be homogenized and placed into glass jars.

Soil sampling for per- and polyfluoroalkyl substances (PFAS) will be conducted in accordance with United States Environmental Protection Agency (USEPA) Draft Method 1633 Field Sampling Guidelines. PFAS samples will be collected first in High Density Polyethylene (HDPE)/polypropylene containers using sampling equipment either made with stainless steel, HDPE, or polypropylene. Food and beverages will be prohibited near the sampling equipment. Additionally, no cosmetics, moisturizers, hand cream, sun

screen or clothing materials containing Gore-Tex™ or Tyvek® will be worn during sampling.

Soil samples will analyzed for PFAS by USEPA Draft Method 1633 Modified and 1,4-dioxane by USEPA Method 8270 selective ion monitoring (SIM). Both methods listed above will be able to meet the reporting limits for PFAS (0.5 microgram per kilogram [µg/kg]) and 1,4-dioxane (0.1 milligram per kilogram [mg/kg]) in soil.

After collection, sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4 and 5.6. Analysis and/or extraction and digestion of collected soil samples will meet the holding times required for each analyte as specified in Attachment E. In addition, analysis of collected soil sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

Groundwater Samples

Groundwater sampling will be conducted using low-flow sampling procedures following USEPA guidance ("Low Stress [low flow] Purging and Sampling Procedure for the Collection of Groundwater Samples from Monitoring Wells", EQASOP-GW4, dated July 30, 1996, revised September 19, 2017).

During purging, field parameters should be measured, including: water level drawdown, purge rate, pH, specific conductance, temperature, dissolved oxygen, turbidity and ORP, every five minutes using a water quality meter (YSI 6820 or similar) and a depth-to-water interface probe that should be decontaminated between wells. Samples should generally not be collected until the field parameters have stabilized. Field parameters will be considered stable once three sets of measurements are within ±0.1 standard units for pH, ±3% for conductivity and temperature, ±10 millivolts for ORP, and ±10% for turbidity and dissolved oxygen. Purge rates should be adjusted to keep the drawdown in the well to less than 0.3 feet, as practical. Additionally, an attempt should be made to achieve a stable turbidity reading of less than 5 Nephelometric Turbidity Units (NTU) prior to sampling. If the turbidity reading does not stabilize at a reading of less than 5 NTU for a given well, then both filtered and unfiltered samples should be collected from that well. If necessary, field filtration should be performed using a 0.45 micron disposable in-line filter. Groundwater samples should be collected after parameters have stabilized as noted above or the readings are within the precision of the meter. Deviations from the stabilization and drawdown criteria, if any, should be noted on the sampling logs.

Groundwater sampling for PFAS and 1,4-dioxane will be performed in accordance with the NYSDEC-approved Groundwater Monitoring Plan, dated August 27, 2004, which specifies purging three to five well volumes prior to sample collection. The pump will be

decontaminated with Alconox and water. Field personnel will wear nitrile gloves while collecting and handing groundwater samples.

Groundwater sampling for PFAS will be conducted in accordance with EPA Method 537 Field Sampling Guidelines. PFAS samples will be collected first in HDPE/polypropylene containers using sampling equipment either made with stainless steel, HDPE, or polypropylene. Food and beverages will be prohibited near the sampling equipment. Additionally, no cosmetics, moisturizers, hand cream, sun screen or clothing materials containing Gore-Tex™ or Tyvek® will be worn during sampling.

Groundwater samples will analyzed for PFAS by USEPA Draft Method 1633 Modified and 1,4-dioxane by USEPA Method 8270 SIM. Both methods listed above will be able to meet the reporting limits for PFAS (2 nanograms per liter [ng/L]) and 1,4-dioxane (0.35 micrograms per liter [µg/L]) in groundwater.

Samples should be collected directly into laboratory-supplied jars. After collection, all sample jars will be capped and securely tightened, and placed in iced coolers and maintained at 4°C ±2°C until they are transferred to the laboratory for analysis, in accordance with the procedures outlined in Section 5.4 and 5.6. Analysis and/or extraction and digestion of collected groundwater samples will meet the holding times required for each analyte as specified in Attachment C. In addition, analysis of collected groundwater sample will meet all quality assurance criteria set forth by this QAPP and DER-10.

A list of the PFAS is provided in Attachment B. Groundwater samples collected for analysis of PFAS will be collected in accordance with the specialized protocols outlined in Attachment E.

Sample Field Blanks and Field Duplicates

Field blanks will be collected for quality assurance purposes at a rate of one per 20 investigative samples per matrix (soil and groundwater only). Field blanks will be obtained by pouring laboratory-demonstrated analyte-free water on or through a decontaminated sampling device following use and implementation of decontamination protocols. The water will be collected off of the sampling device into a laboratory-provided sample container for analysis. Field blank samples will be analyzed for the complete list of analytes on the day of sampling. To assess contamination resulting from sample transport, trip blanks will be collected at a rate of one per day if soil samples are analyzed for VOCs during that day. Equipment blanks will be collected at a minimum frequency of one per day per matrix for PFAS.

Field duplicate soil and groundwater samples will be collected and analyzed for quality assurance purposes. Field duplicate samples will be collected at a frequency of 1 per 20

investigative samples per matrix and will be submitted to the laboratory as "blind" samples. If less than 20 samples are collected during a particular sampling event, one field duplicate sample will be collected. Field duplicates will be collected from the same sample volume as the parent sample.

5.4 SAMPLE CONTAINERS AND HANDLING

Certified, commercially clean sample containers will be obtained from the analytical laboratory. If soil or groundwater samples are being collected, the laboratory will also prepare and supply the required trip blanks and field blank sample containers and reagent preservatives. Sample bottle containers, including the field blank containers, will be placed into plastic coolers by the laboratory. These coolers will be received by the field sampling team within 24 hours of their preparation in the laboratory. Prior to the commencement of field work, Langan field personnel will fill the plastic coolers with ice in Ziploc® bags (or equivalent) to maintain a temperature of 4° ±2° C.

Soil and/or groundwater samples collected in the field for laboratory analysis will be placed directly into the laboratory-supplied sample containers. Samples will then be placed and stored on ice in laboratory provided coolers until shipment to the laboratory. Blue ice will not be used to cool PFAS samples. The temperature in the coolers containing samples and associated field blanks will be maintained at a temperature of 4°±2°C while on-site and during sample shipment to the analytical laboratory.

Possession of samples collected in the field will be traceable from the time of collection until they are analyzed by the analytical laboratory or are properly disposed. Chain-of-custody procedures, described in Section 5.9, will be followed to maintain and document sample possession. Samples will be packaged and shipped as described in Section 5.6.

5.5 SPECIAL CONSIDERATIONS FOR PFAS SAMPLE COLLECTION

The following special considerations apply to the collection of groundwater samples for PFAS analysis to prevent cross-contamination:

- Field equipment will not contain Teflon®
- All sampling material will be made from stainless steel, HDPE, acetate, silicon, or polypropylene
- No waterproof field books will be used
- No plastic clipboards, binders, or spiral hard cover notebooks will be used
- No adhesives will be used
- No sharpies or permanent markers will be used; ball point pens are acceptable

- Aluminum foil will not be used
- PFAS samples will be kept in a separate cooler from other sampling containers
- Coolers will be filled only with regular ice

PFAS compound sampling protocol and the laboratories SOP for PFAS analysis are provided in Attachment E.

5.6 SAMPLE PRESERVATION

Sample preservation measures will be used in an attempt to prevent sample decomposition by contamination, degradation, biological transformation, chemical interactions and other factors during the time between sample collection and analysis. Preservation will commence at the time of sample collection and will continue until analyses are performed. Should chemical preservation be required, the analytical laboratory will add the preservatives to the appropriate sample containers before shipment to the office or field. Samples will be preserved according to the requirements of the specific analytical method selected, as shown in Attachment C.

5.7 SAMPLE SHIPMENT

5.7.1 Packaging

Soil vapor samples canisters can be stored and transported without additional packaging. Soil and groundwater sample containers will be placed in plastic coolers. Ice in Ziploc® bags (or equivalent) will be placed around sample containers. Cushioning material will be added around the sample containers if necessary. Chains-of-custody and other paperwork will be placed in a Ziploc® bag (or equivalent) and placed inside the cooler. The cooler will be taped closed and custody seals will be affixed to one side of the cooler at a minimum. If the samples are being shipped by an express delivery company (e.g. FedEx) then laboratory address labels will be placed on top of the cooler.

5.7.2 Shipping

Standard procedures to be followed for shipping environmental samples to the analytical laboratory are outlined below.

- All environmental samples will be transported to the laboratory by a laboratory-provided courier under the chain-of-custody protocols described in Section 5.9.

- Prior notice will be provided to the laboratory regarding when to expect shipped samples. If the number, type or date of shipment changes due to site constraints or program changes, the laboratory will be informed.

5.8 DECONTAMINATION PROCEDURES

Decontamination procedures will be used for non-dedicated sampling equipment. Decontamination of field personnel is discussed in the site-specific Health and Safety Plan (HASP) appended to the RIWP. Field sampling equipment that is to be reused will be decontaminated in the field in accordance with the following procedures:

1. Laboratory-grade glassware detergent and tap water scrub to remove visual contamination
2. Generous tap water rinse
3. Distilled/de-ionized water rinse

Any field sampling equipment that is to be reused for PFAS sampling will be decontaminated in the field in accordance with the following procedures:

1. Alconox detergent and "PFAS-free" water scrub to remove visual contamination
2. Generous PFAS-free" water rinse

5.9 RESIDUALS MANAGEMENT

Debris (e.g., paper, plastic and disposable personal protective equipment) will be collected in plastic garbage bags and disposed of as non-hazardous industrial waste. Debris is expected to be transported to a local municipal landfill for disposal. If applicable, residual solids (e.g., leftover soil cuttings) will be placed back in the borehole from which it was sampled. If gross contamination is observed, soil will be collected and stored in Department of Transportation (DOT)-approved 55-gallon drums in a designated storage area at the site. All drums will be properly labeled, sealed, and characterized as necessary. The residual materials will be stored in a designated storage area at the site for further characterization, treatment or disposal.

Residual fluids (such as purge water) will be collected and stored in DOT-approved (or equivalent) 55-gallon drums in a designated storage area at the site. The residual fluids will be transported to the on-site wastewater treatment plant or analyzed, characterized and disposed off-site in accordance with applicable federal and state regulations. Residual fluids such as decontamination water may be discharged to the ground surface, however, if gross contamination is observed, the residual fluids will be collected, stored, and transported similar to purge water or other residual fluids.

5.10 CHAIN OF CUSTODY PROCEDURES

A chain-of-custody protocol has been established for collected samples that will be followed during sample handling activities in both field and laboratory operations. The

primary purpose of the chain-of-custody procedures is to document the possession of the samples from collection through shipping, storage and analysis to data reporting and disposal. Chain-of-custody refers to actual possession of the samples. Samples are considered to be in custody if they are within sight of the individual responsible for their security or locked in a secure location. Each person who takes possession of the samples, except the shipping courier, is responsible for sample integrity and safe keeping. Chain-of-custody procedures are provided below:

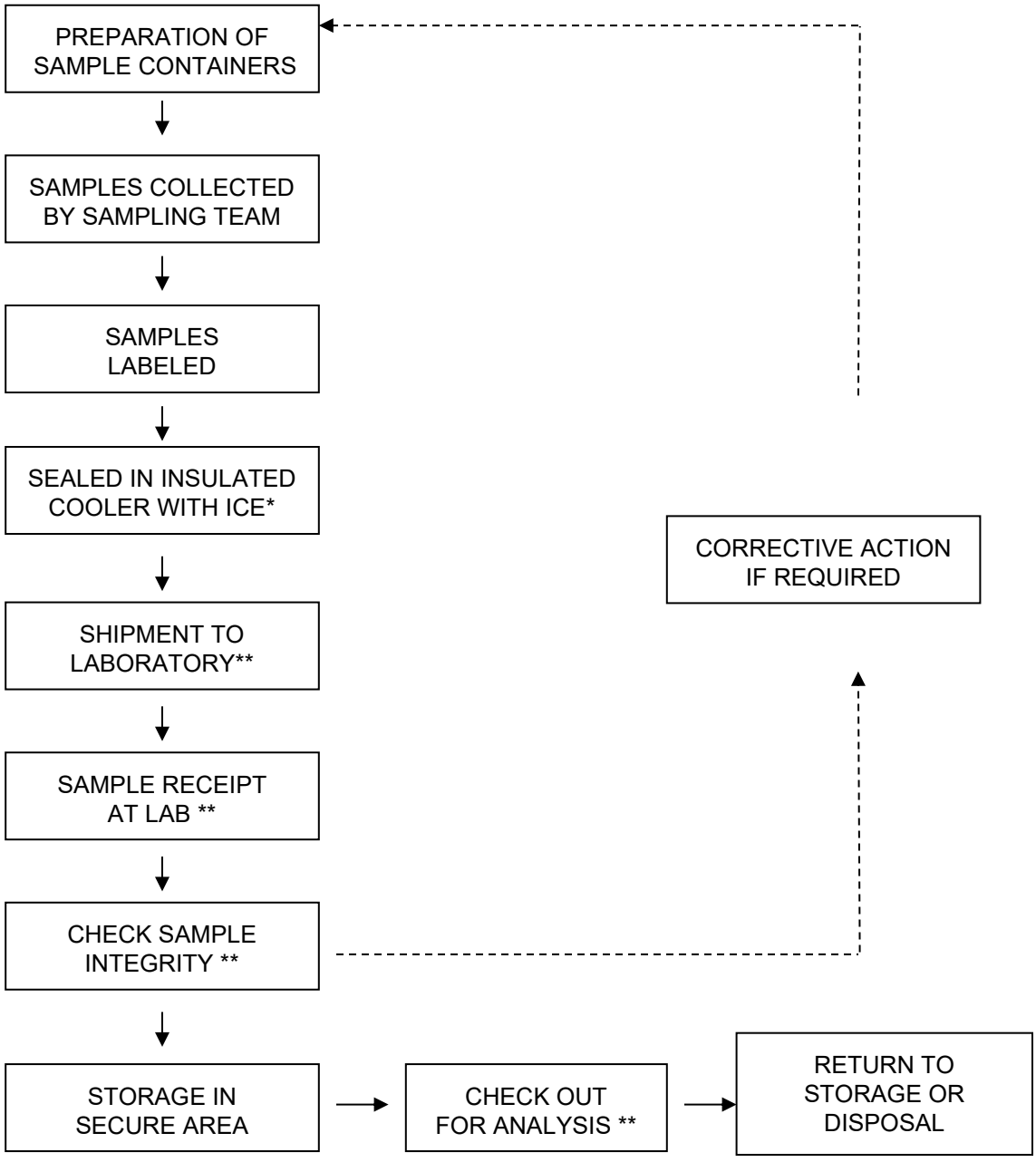
- Chain-of-custody will be initiated by the laboratory supplying the pre-cleaned and prepared sample containers. Chain-of-custody forms will accompany the sample containers.
- Following sample collection, the chain-of-custody form will be completed for the sample collected. The sample identification number, date and time of sample collection, analysis requested and other pertinent information (e.g., preservatives) will be recorded on the form. All entries will be made in waterproof, permanent blue or black ink.
- Langan field personnel will be responsible for the care and custody of the samples collected until the samples are transferred to another party, dispatched to the laboratory, or disposed. The sampling team leader will be responsible for enforcing chain-of-custody procedures during field work.
- When the form is full or when all samples have been collected that will fit in a single cooler, the sampling team leader will check the form for possible errors and sign the chain-of-custody form. Any necessary corrections will be made to the record with a single strike mark, dated, and initialed.

When soil and/or groundwater samples are collected, sample coolers will be accompanied by the chain-of-custody form, sealed in a Ziploc® bag (or equivalent) and placed on top of the samples or taped to the inside of the cooler lid. If applicable, a shipping bill will be completed for each cooler and the shipping bill number recorded on the chain-of-custody form.

Samples will be packaged for shipment to the laboratory with the appropriate chain-of-custody form. A copy of the form will be retained by the sampling team for the project file and the original will be sent to the laboratory with the samples. Bills of lading will also be retained as part of the documentation for the chain-of-custody records, if applicable. When transferring custody of the samples, the individuals relinquishing and receiving custody of the samples will verify sample numbers and condition and will document the sample acquisition and transfer by signing and dating the chain-of-custody form. This process documents sample custody transfer from the sampler to the analytical laboratory.

A flow chart showing a sample custody process is included as Figure 5.1, and example chain-of-custody forms are included as Figures 5.2 and 5.3.

Figure 5.1 Sample Custody



** REQUIRES SIGN-OFF ON CHAIN-OF-CUSTODY FORM

Figure 5.3 Sample Chain-of-Custody Form – Soil and Groundwater Samples

YORK
ANALYTICAL LABORATORIES INC

Field Chain-of-Custody Record

York Analytical Laboratories, Inc. (YORK)'s Standard Terms & Conditions are listed on the back side of this document.
This document serves as your written authorization for YORK to proceed with the analyses requested below.
Your signature binds you to YORK's Standard Terms & Conditions.

YORK Project No.

120 Research Drive Stratford, CT 06615 132-02 89th Ave Queens, NY 11418 56 Church Hill Rd. #2 Newtown, CT 06470 clientservices@yorklab.com www.yorklab.com 800-306-YORK Page _____ of _____

YOUR Information	Report To:	Invoice To:	YOUR Project Number	Turn-Around Time
Company:	Company:	Company:		RUSH - Next Day
Address:	Address:	Address:		RUSH - Two Day
			YOUR Project Name	RUSH - Three Day
Phone.:	Phone.:	Phone.:		RUSH - Four Day
Contact:	Contact:	Contact:		RUSH - Five Day
E-mail:	E-mail:	E-mail:	YOUR PO#:	Standard (6-9 Day)
				PFAS Standard is 7-10 Days

Please print clearly and legibly. All information must be complete. Samples will not be logged in and the turn-around-time clock will not begin until any questions by YORK are resolved.

Samples Collected by: (print AND sign your name)

Matrix Codes	Samples From	Report / EDD Type (circle selections)			YORK Reg. Comp.
S - soil / solid	New York	Summary Report	CT RCP	EQuIS (Standard)	Compared to the following Regulation(s): (please fill in)
GW - groundwater	New Jersey	QA Report	CT RCP DQA/DUE	NYSDEC EQuIS	
DW - drinking water	Connecticut	CMDP	NJDEP Reduced Deliverables	NJDKQP	
WW - wastewater	Pennsylvania	Standard Excel EDD		NJDEP SRP HazSite	
O - Oil / Other	Other:	NY ASP B Package	Other:		

Sample Identification	Sample Matrix	Date/Time Sampled	Analyses Requested	Container Type	No.

Comments:

Samples iced/chilled at time of lab pickup? circle Yes or No

Preservation: (check all that apply)
HCl ____ MeOH ____ HNO3 ____ H2SO4 ____ NaOH ____
ZnAc ____ Ascorbic Acid ____ Other: _____

Special Instruction
Field Filtered
Lab to Filter

1. Samples Relinquished by / Company	Date/Time	1. Samples Received by / Company	Date/Time	2. Samples Relinquished by / Company	Date/Time
2. Samples Received by / Company	Date/Time	3. Samples Relinquished by / Company	Date/Time	3. Samples Received by / Company	Date/Time
4. Samples Relinquished by / Company	Date/Time	4. Samples Received by / Company	Date/Time	Samples Received in LAB by	Date/Time Temperature Degrees C

Laboratory chain-of-custody will be maintained throughout the analytical processes as described in the laboratory's Quality Assurance Manual. The analytical laboratory will provide a copy of the chain-of-custody in the analytical data deliverable package. The chain-of-custody becomes the permanent record of sample handling and shipment.

5.11 LABORATORY SAMPLE STORAGE PROCEDURES

The subcontracted laboratory will use a laboratory information management system (LIMS) to track and schedule samples upon receipt by the analytical laboratories. Any sample anomalies identified during sample log-in must be evaluated on individual merit for the impact upon the results and the data quality objectives of the project. When irregularities do exist, the environmental consultant must be notified to discuss recommended courses of action and documentation of the issue must be included in the project file.

For samples requiring thermal preservation, the temperature of each cooler will be immediately recorded. Each sample and container will be assigned a unique laboratory identification number and secured within the custody room walk-in coolers designated for new samples. Samples will be, as soon as practical, disbursed in a manner that is functional for the operational team. The temperature of all coolers and freezers will be monitored and recorded using a certified temperature sensor. Any temperature excursions outside of acceptance criteria (i.e., below 2°C or above 6°C) will initiate an investigation to determine whether any samples may have been affected. Samples for VOCs will be maintained in satellite storage areas within the VOC laboratory. Following analysis, the laboratory's specific procedures for retention and disposal will be followed as specified in the laboratory's SOPs and/or QA manual.

6.0 DATA REDUCTION, VALIDATION, AND REPORTING

6.1 INTRODUCTION

Data collected during the field investigation will be reduced and reviewed by the laboratory QA personnel, and a report on the findings will be tabulated in a standard format. The criteria used to identify and quantify the analytes will be those specified for the applicable methods in the USEPA SW-846 and subsequent updates. The data package provided by the laboratory will contain all items specified in the USEPA SW-846 methodology appropriate for the analyses to be performed and be reported in standard format.

The completed copies of the chain-of-custody records (both external and internal) accompanying each sample from time of initial bottle preparation to completion of analysis shall be attached to the analytical reports.

6.2 DATA REDUCTION

The Analytical Services Protocol (ASP) Category B data packages and an electronic data deliverable (EDD) will be provided by the laboratory after receipt of a complete sample delivery group. The Project Manager will immediately arrange for archiving the results and preparation of result tables. These tables will form the database for assessment of the site contamination condition.

Each EDD deliverable must be formatted using a Microsoft Windows operating system and the NYSDEC data deliverable format for Environmental Quality Information System (EQuIS). To avoid transcription errors, data will be loaded directly into the American Standard Code (ASC)II format from the LIMS. If this cannot be accomplished, the consultant should be notified via letter of transmittal indicating that manual entry of data is required for a particular method of analysis. All EDDs must also undergo a QC check by the laboratory before delivery. The original data, tabulations, and electronic media are stored in a secure and retrievable fashion.

The Project Manager or Task Manager will maintain close contact with the QA reviewer to ensure all non-conformance issues are acted upon prior to data manipulation and assessment routines. Once the QA review has been completed, the Project Manager may direct the Team Leaders or others to initiate and finalize the analytical data assessment.

6.3 DATA VALIDATION

Data validation will be performed in accordance with the USEPA Region 2 SOPs for data validation and USEPA's National Functional Guidelines for Organic and Inorganic Data Review. Tier 1 data validation (the equivalent of USEPA's Stage 2A validation) will be performed to evaluate data quality. Tier 1 data validation is based on completeness and compliance checks of sample-related QC results including:

- Holding times;
- Sample preservation;
- Blank results (method, trip, and field blanks);
- Surrogate recovery compounds and isotope dilution standards (as applicable);
- LCS/LCSD recoveries and RPDs;
- MS/MSD recoveries and RPDs;
- Laboratory duplicate RPDs; and
- Field duplicate RPDs.

A Data Usability Summary Report (DUSR) will be prepared by the data validator and reviewed by the QAO before issuance. The DUSR will present the results of data validation, including a summary assessment of laboratory data packages, sample preservation and chain-of-custody procedures, and a summary assessment of precision, accuracy, representativeness, comparability, and completeness for each analytical method.

Based on the results of data validation, the validated analytical results reported by the laboratory may be assigned the following validation qualification:

- "U" - Not detected. The associated number indicates the approximate sample concentration necessary to be detected significantly greater than the level of the highest associated blank;
- "UJ" - Not detected. The reporting limit may be inaccurate or imprecise;
- "J" - Analyte is present. Reported value may be associated with a higher level of uncertainty than is normally expected with the analytical method;
- "N" – Tentative identification. Analyte is considered present in the sample;

- "R" – Unreliable result; data is rejected or unusable. Analyte may or may not be present in the sample; and
- No Flag - Result accepted without qualification.

7.0 QUALITY ASSURANCE PERFORMANCE AUDITS AND SYSTEM AUDITS

7.1 INTRODUCTION

Quality assurance audits may be performed by the project quality assurance group under the direction and approval of the QAO. These audits will be implemented to evaluate the capability and performance of project and subcontractor personnel, items, activities, and documentation of the measurement system(s). Functioning as an independent body and reporting directly to corporate quality assurance management, the QAO may plan, schedule, and approve system and performance audits based upon procedures customized to the project requirements. At times, the QAO may request additional personnel with specific expertise from company and/or project groups to assist in conducting performance audits. However, these personnel will not have responsibility for the project work associated with the performance audit.

7.2 SYSTEM AUDITS

System audits may be performed by the QAO or designated auditors, and encompass a qualitative evaluation of measurement system components to ascertain their appropriate selection and application. In addition, field and laboratory quality control procedures and associated documentation may be system audited. These audits may be performed once during the performance of the project. However, if conditions adverse to quality are detected or if the Project Manager requests, additional audits may occur.

7.3 PERFORMANCE AUDITS

The laboratory may be required to conduct an analysis of Performance Evaluation samples or provide proof that Performance Evaluation samples submitted by USEPA or a state agency have been analyzed within the past twelve months.

7.4 FORMAL AUDITS

Formal audits refer to any system or performance audit that is documented and implemented by the QA group. These audits encompass documented activities performed by qualified lead auditors to a written procedure or checklists to objectively verify that quality assurance requirements have been developed, documented, and instituted in accordance with contractual and project criteria. Formal audits may be performed on project and subcontractor work at various locations.

Audit reports will be written by auditors who have performed the site audit after gathering and evaluating all data. Items, activities, and documents determined by lead auditors to be in noncompliance shall be identified at exit interviews conducted with the involved management. Non-compliances will be logged, and documented through audit findings,

which are attached to and are a part of the integral audit report. These audit-finding forms are directed to management to satisfactorily resolve the noncompliance in a specified and timely manner.

The Project Manager has overall responsibility to ensure that all corrective actions necessary to resolve audit findings are acted upon promptly and satisfactorily. Audit reports must be submitted to the Project Manager within fifteen days of completion of the audit. Serious deficiencies will be reported to the Project Manager within 24 hours. All audit checklists, audit reports, audit findings, and acceptable resolutions are approved by the QAO prior to issue. Verification of acceptable resolutions may be determined by re-audit or documented surveillance of the item or activity. Upon verification acceptance, the QAO will close out the audit report and findings.

8.0 CORRECTIVE ACTION

8.1 INTRODUCTION

The following procedures have been established to ensure that conditions adverse to quality, such as malfunctions, deficiencies, deviations, and errors, are promptly investigated, documented, evaluated, and corrected.

8.2 PROCEDURE DESCRIPTION

When a significant condition adverse to quality is noted at a site, laboratory, or subcontractor location, the cause of the condition will be determined and corrective action will be taken to preclude repetition. Condition identification, cause, reference documents, and corrective action planned to be taken will be documented and reported to the QAO, Project Manager, Field Team Leader and involved contractor management, at a minimum. Implementation of corrective action is verified by documented follow-up action.

All project personnel have the responsibility, as part of the normal work duties, to promptly identify, solicit approved correction, and report conditions adverse to quality. Corrective actions will be initiated as follows:

- When predetermined acceptance standards are not attained;
- When procedure or data compiled are determined to be deficient;
- When equipment or instrumentation is found to be faulty;
- When samples and analytical test results are not clearly traceable;
- When quality assurance requirements have been violated;
- When designated approvals have been circumvented;
- As a result of system and performance audits;
- As a result of a management assessment;
- As a result of laboratory/field comparison studies; and
- As required by USEPA SW-846, and subsequent updates, or by the NYSDEC ASP.

Project management personnel, field investigation teams, remedial response planning personnel, and laboratory groups monitor on-going work performance in the normal course of daily responsibilities. Work may be audited at project sites, laboratories, or contractor locations. Activities, or documents ascertained to be noncompliant with quality assurance requirements will be documented. Corrective actions will be mandated through audit finding sheets attached to the audit report. Audit findings are logged, maintained, and controlled by the Task Manager.

Personnel assigned to quality assurance functions will have the responsibility to issue and control Corrective Action Request (CAR) Forms (Figure 8.1 or similar by email). The CAR identifies the

out-of-compliance condition, reference document(s), and recommended corrective action(s) to be administered. The CAR is issued to the personnel responsible for the affected item or activity. A copy is also submitted to the Project Manager. The individual to whom the CAR is addressed returns the requested response promptly to the QA personnel, affixing his/her signature and date to the corrective action block, after stating the cause of the conditions and corrective action to be taken. The QA personnel maintain the log for status of CARs, confirms the adequacy of the intended corrective action, and verifies its implementation. CARs will be retained in the project file for the records.

Any project personnel may identify noncompliance issues; however, the designated QA personnel are responsible for documenting, numbering, logging, and verifying the close out action. The Project Manager will be responsible for ensuring that all recommended corrective actions are implemented, documented, and approved.

Figure 8.1 Corrective Action Request

CORRECTIVE ACTION REQUEST

Number: _____ Date: _____

TO: _____

You are hereby requested to take corrective actions indicated below and as otherwise determined by you to (a) resolve the noted condition and (b) to prevent it from recurring. Your written response is to be returned to the project quality assurance manager by _____

CONDITION:

REFERENCE DOCUMENTS:

RECOMMENDED CORRECTIVE ACTIONS:

_____ _____ _____ _____ _____ _____

Originator Date Approval Date Approval Date

RESPONSE

CAUSE OF CONDITION

CORRECTIVE ACTION

(A) RESOLUTION

(B) PREVENTION

(C) AFFECTED DOCUMENTS

C.A. FOLLOWUP:

CORRECTIVE ACTION VERIFIED BY: _____ DATE:_____

9.0 REFERENCES

NYSDEC. Division of Environmental Remediation. DER-10/Technical Guidance for Site Investigation and Remediation, dated May 3, 2010.

Taylor, J. K., 1987. Quality Assurance of Chemical Measurements. Lewis Publishers, Inc., Chelsea, Michigan

USEPA, 1986. SW-846 "Test Method for Evaluating Solid Waste," dated November 1986. USEPA, Washington, D.C.

USEPA, 1987. Data Quality Objectives for Remedial Response Actions Activities: Development Process, EPA/540/G-87/003, OSWER Directive 9355.0-7- USEPA, Washington, D.C.

USEPA, 1992a. CLP Organics Data Review and Preliminary Review. SOP No. HW-6, Revision #8, dated January 1992. USEPA Region II.

USEPA, 1992b. Evaluation of Metals Data for the Contract Laboratory Program (CLP) based on SOW 3/90. SOP No. HW-2, Revision XI, dated January 1992. USEPA Region II.

USEPA, 2016. Low/Medium Volatile Data Validation. SOP No. HW-33A, Revision 1, dated September 2016. USEPA Region II.

USEPA, 2015. PCB Aroclor Data Validation. SOP No. HW-37A, Revision 0, dated July 2015. USEPA Region II.

USEPA, 2016. ICP-AES Data Validation. SOP No. HW-3a, Revision 1, dated September 2016. USEPA Region II.

USEPA, 2016. Mercury and Cyanide Data Validation. SOP No. HW-3c, Revision 1, dated September 2016. USEPA Region II.

USEPA, 2016. Pesticide Data Validation. SOP No. HW-36A, Revision 1, dated October 2016. USEPA Region II.

USEPA, 2016. Semivolatile Data Validation. SOP No. HW-35A, Revision 1, dated September 2016. USEPA Region II.

USEPA 2020a. National Functional Guidelines for Organic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-20-005, November 2020.

USEPA 2020b. National Functional Guidelines for Inorganic Superfund Methods Data Review, Office of Superfund Remediation and Technology Innovation, EPA-540-R-20-006, November 2020

ATTACHMENT A

RESUMES

WILLIAM BOHRER, PG

SENIOR PROJECT GEOLOGIST

GEOLOGIST

Mr. Bohrer is an experienced geologist responsible for managing Langan's environmental standards and Health and Safety compliance for projects throughout New York City. His services include dissemination of environmental protocols, troubleshooting at project sites, in-house/field training, and maintenance of quality standards across the environmental discipline. Mr. Bohrer has a diverse and extensive background in geophysics, hydrogeology, mining and petroleum, and geotechnical engineering. He has developed conceptual site models for public, industrial and commercial facilities nationwide.



SELECTED PROJECTS

- NYU Poly – 122 Johnson Street, Brooklyn, NY
- Con Edison of New York at Governor's Island, NY, NY
- 535 4th Avenue, Brooklyn, NY
- 27 Wooster Street, New York, NY
- 42 West Street, Brooklyn, NY
- 455 West 19th Street, New York, NY
- Kings Plaza Mall, Brooklyn, NY
- Hudson Yards "Terra Firma," New York, NY
- Hudson Yards, Platform Special Inspection, New York, NY
- PSAC II, Bronx, NY
- 595-647 Smith Street, Brooklyn, NY
- New York University, 7-13 Washington Square North Investigation, New York, NY
- NYU 4 Washington Square Village, New York, NY
- 125th Street and Lenox Avenue, New York, NY
- Sullivan Street Development, New York, NY
- Hudson Crossing II, New York, NY
- New York Aquarium, Shark Tank & Animal Care Facility, Brooklyn, NY
- 209-219 Sullivan Street, New York, NY
- 261 Hudson Street, New York, NY
- 460 Washington Street, New York, NY
- 552 West 24th Street, New York, NY
- Brooklyn Bridge Park Pier 1, New York, NY
- International Leadership Bronx Charter School, Bronx, NY
- 203 East 92nd Street, New York, NY
- HighLine 28-29, New York, NY
- 539 Smith Street Bulkhead, Brooklyn, NY
- Willets Point, Corona, NY
- Plume Migration and Fracture Flow Aquifer Investigation, Brunswick, MD
- Plume Migration and Fracture Flow Aquifer Investigation, Fallston, MD
- Emergency Response Site Investigation & Remediation, Wappingers Falls, NY
- Emergency Response Site Investigation & Remediation, Allentown, PA

EDUCATION

Post Graduate Studies in Geophysics
Cornell University

B.S., Geology
Tufts University

PROFESSIONAL REGISTRATION

Professional Geologist (PG) in NY

40 Hour OSHA HazWOPER

OSHA Construction Safety & Health

OSHA Supervisory Certification Credential (TWIC)

Transportation Worker Identification

NYS DEC- Protecting New York's Natural Resources with Better Construction Site Management

AFFILIATIONS

American Association of Petroleum Geologists

National Groundwater Association

Geological Society of America

LANGAN

- Emergency Response Site Investigation & Remediation, Shamokin, PA
- Bermuda International Airport, Jet Fuel Release Investigation, Bermuda
- Little Missouri River Basin, Geotechnical Site Evaluation (Horizontal Drilling Pipeline Install), ND
- Seismic Susceptibility Evaluation (Class 2 Injection Wells), Litchfield, OH
- Bedrock Mapping, Bradford and Sullivan Counties, PA
- Soil Solidification, Carteret, NJ

NY State Council of Professional Geologist

American Geophysical Union



JOSEPH CONBOY

Project Chemist
Environmental Engineering

Education

B.S., Chemistry,
Rowan University

Mr. Conboy has 12 years of experience in environmental consulting, specializing in chemical data validation, data quality assessments, data usability evaluations, and EQuIS database management. ears of experience in environmental consulting, specializing in chemical data validation, data quality assessments, data usability evaluations, and EQuIS database management.

Selected Projects

- Former Ballantine Brewery, Newark, NJ
- Former Curtiss-Wright Facility, Wood-Ridge, NJ
- Former Duane Marine Site, Perth Amboy, NJ
- Former Perth Amboy Gas Works, Perth Amboy, NJ
- Former Plessey Dynamics Site, Hillside, NJ
- Former MGP Site, Wildwood, NJ
- JCP&L Union Beach District Office, Keyport, NJ
- K-8 School, New Brunswick, NJ
- Linden Terminal, Linden, NJ
- Paulsboro Packaging Site, Paulsboro, NJ
- 23-30 Borden Avenue, Long Island City, NY
- 25-01 Queens Plaza North, Long Island City, NY
- 37-11 30th Street, Long Island City, NY
- 266 West 96th Street, New York, NY
- 414 Gerard Avenue, Bronx, NY
- 445 Gerard Avenue, Bronx, NY
- 475 Bay Street, Staten Island,
- 538-544 Hudson Street, New York, NY
- 805-825 Atlantic Avenue, Brooklyn, NY
- 1400 Ferris Place, Bronx, NY
- 1607 Surf Avenue, Coney Island, NY
- 1900 River Road, Burlington, NJ
- 2447 Third Avenue, New York, NY
- ABC - Block 27, Long Island City, NY
- American Dream Meadowlands, East Rutherford, NJ
- Bedford Armory, Brooklyn, NY
- Gowanus Canal Northside, Brooklyn, NY
- President Street Properties, New York, NY
- Suffolk Street, New York, NY
- Willets Point, Queens, NY

ANTHONY MOFFA, JR., ASP, CHMM, COSS, CSP

ASSOCIATE
CORPORATE HEALTH AND SAFETY MANAGER

Anthony is Langan's Corporate Health & Safety Manager and is responsible for managing health and safety compliance in all Langan office locations. He has 29 years of experience in the health and safety field. He is responsible for ensuring compliance with all federal and state occupational health and safety laws and development and implementation of corporate health and safety policies. His responsibilities include reviewing and updating Langan's Corporate Health and Safety Program and assisting employees in the development of site specific Health & Safety Plans. He maintains and manages health and safety records for employees in all Langan office locations including medical evaluations, respirator fit testing, and Hazardous Waste Operations and Emergency Response training. He is also responsible for documentation and investigation of work-related injuries and incidents and sharing this information with employees to assist in the prevention of future incidents. He is also the chairman of the Corporate Health & Safety Committee and Health & Safety Leadership Team that meet periodically throughout the year. He is responsible for coordinating and providing health and safe training to Langan employees. He was formerly the Environmental, Health and Safety Coordinator at a chemical manufacturer. His experience included employee hazard communications, development of material safety data sheets for developed products, respirator fit testing and conducting required Occupational Health & Safety Association and Department of Transportation training.



EDUCATION

B.S., Physics
West Chester University

PROFESSIONAL REGISTRATION

Associate Safety Professional (ASP)

Certified Hazardous Material Manager (CHMM)

Certified Occupational Safety Specialist (COSS)

Certified Safety Professional (CSP)

AFFILIATIONS

Pennsylvania Chamber of Business & Industry

Chemical Council of New Jersey

New Jersey Business & Industry Association

American Society of Safety Professionals

CONNOR MOORE

SENIOR STAFF SCIENTIST

ENVIRONMENTAL ENGINEERING

Mr. Moore has six years of experience specializing in environmental consulting. He has a strong background in conducting due diligence investigations and implementing remedial solutions, with a particular emphasis on large-scale projects with several stakeholders. Mr. Moore's technical expertise spans environmental site assessments, remedial investigation, and comprehensive air quality monitoring for industrial, commercial, utility, and public-sector environments. He will support the environmental group in New York City.



SELECTED PROJECTS

- Abraham Lincoln High School, Los Angeles, CA*
- Expanded Learning Opportunities Program, Los Angeles County, CA*
- California Water Service Subgrade Vaults, Los Angeles, Kern, San Mateo and Santa Clara Counties, CA*
- 17352 Daimler Street, Irvine, CA*

EDUCATION

B.A., Environmental Biology
Columbia University

PROFESSIONAL REGISTRATION

OSHA 40-Hr HAZWOPER

OSHA 8-Hr HAZWOPER Supervisor

**Work performed prior to joining Langan.*

KRISTEN WEXLER

PROJECT SCIENTIST

ENVIRONMENTAL ENGINEERING

Ms. Wexler is an environmental scientist with four years of experience working within the environmental consulting industry in New York City and throughout the state of New York. She is experienced in Phase I Environmental Site Assessments, field investigation implementation and coordination, spill delineation, construction oversight, CAMP, underground storage tank removals, erosion and sediment control inspections, on-site subcontractor management, and utilization of AutoCAD software. She holds experience working at commercial, industrial, municipal, and undeveloped sites within the state of New York.



SELECTED PROJECTS

- Alafia/Brooklyn Development Center, Brooklyn, NY
- 362 West 125th Street, Construction Oversight and CAMP, New York, NY
- 320 West Fordham Road, New York, NY
- NYU 181 Mercer Street, Construction Oversight and CAMP, New York, NY
- Bronx Point, Drilling/Sampling, Reporting, Construction Oversight, and CAMP, Bronx, NY
- 540 West 21st Street, Construction Oversight and CAMP, New York, NY
- 261 Walton Avenue, Brownfield Cleanup Program Investigation, Bronx, NY
- Confidential Projects, Phase I Environmental Site Assessments, Various Locations, NY
- 461 River Road, Underground Storage Tank Removal and Tank Closure, Glenmont, NY
- Warehouse Lane, Underground Tank Removal, Elmsford, NY
- 111 Washington Street, Remedial Investigation, Brownfield Cleanup Program, Spill Delineation, Remedial Reporting, New York, NY
- Confidential Project, GIS Data Mapping, Long Island, NY
- Jamaica Bay Landing, Remedial Action Plan, Construction Oversight, Brooklyn, NY

SELECTED PUBLICATIONS, REPORTS, AND PRESENTATIONS

Wexler, K., "The invasive tunicate, Styela clava, as an ecosystem engineering Long Island Sound", Coastal and Estuarine Research Federation 24th Biennial Conference, 2017, Providence, RI

EDUCATION

M.S., Environmental Science
(Environmental Ecology Concentration)
University of New Haven

B.S., Marine Biology
B.S., Environmental Science
(Chemistry Minor)
University of New Haven

PROFESSIONAL REGISTRATION

40-Hour OSHA HAZWOPER

10-Hour OSHA

NYSDEC Erosion and Sediment Control (SWPPP Inspector)

ATTACHMENT B

LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

APPENDIX B
LABORATORY REPORTING LIMITS AND METHOD DETECTION LIMITS

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,1,2-Tetrachloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,1-Trichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,2,2-Tetrachloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1,2-Trichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1-Dichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1-Dichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,1-Dichloropropylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,3-Trichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,3-Trichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,4,5-Tetramethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,4-Trichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2,4-Trimethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dibromo-3-chloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dibromoethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dichloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,2-Dichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,3,5-Trimethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,3-Dichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,3-Dichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,4-Dichlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	1,4-Dioxane	50	100	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2,2-Dichloropropane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2-Butanone	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2-Chlorotoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	2-Hexanone	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	4-Chlorotoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	4-Methyl-2-pentanone	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Acetone	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Acrolein	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Acrylonitrile	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Benzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromochloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromodichloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromoform	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Bromomethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Carbon disulfide	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Carbon tetrachloride	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chlorobenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chloroethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chloroform	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	cis-1,2-Dichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	cis-1,3-Dichloropropylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Cyclohexane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Dibromochloromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Dibromomethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Dichlorodifluoromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Ethyl Benzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Hexachlorobutadiene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Isopropylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methyl acetate	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methyl tert-butyl ether (MTBE)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methylcyclohexane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Methylene chloride	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Naphthalene	2.5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	n-Butylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	n-Propylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	o-Xylene	2.5	5	ug/kg

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p- & m- Xylenes	5	10	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p-Diethylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p-Ethyltoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	p-Isopropyltoluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	sec-Butylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Styrene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	tert-Butyl alcohol (TBA)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	tert-Butylbenzene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Tetrachloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Toluene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	trans-1,2-Dichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	trans-1,3-Dichloropropylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	trans-1,4-dichloro-2-butene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Trichloroethylene	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Trichlorofluoromethane	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Vinyl acetate	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Vinyl Chloride	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Xylenes, Total	7.5	15	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Soil	Chlorodifluoromethane (Freon 22)	2.5	5	ug/kg
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,1,2-Tetrachloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,1-Trichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,2,2-Tetrachloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1,2-Trichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1-Dichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1-Dichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,1-Dichloropropylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,3-Trichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,3-Trichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,4,5-Tetramethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,4-Trichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2,4-Trimethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dibromo-3-chloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dibromoethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dichloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,2-Dichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,3,5-Trimethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,3-Dichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,3-Dichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,4-Dichlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	1,4-Dioxane	40	40	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2,2-Dichloropropane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2-Butanone	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2-Chlorotoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	2-Hexanone	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	4-Chlorotoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	4-Methyl-2-pentanone	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Acetone	1	2	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Acrolein	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Acrylonitrile	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Benzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromochloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromodichloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromoform	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Bromomethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Carbon disulfide	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Carbon tetrachloride	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chlorobenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chloroethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chloroform	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	cis-1,2-Dichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	cis-1,3-Dichloropropylene	0.2	0.5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Cyclohexane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Dibromochloromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Dibromomethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Dichlorodifluoromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Ethyl Benzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Hexachlorobutadiene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Isopropylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methyl acetate	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methyl tert-butyl ether (MTBE)	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methylcyclohexane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Methylene chloride	1	2	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Naphthalene	1	2	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	n-Butylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	n-Propylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	o-Xylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p- & m- Xylenes	0.5	1	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p-Diethylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p-Ethyltoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	p-Isopropyltoluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	sec-Butylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Styrene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	tert-Butyl alcohol (TBA)	0.5	1	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	tert-Butylbenzene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Tetrachloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Toluene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	trans-1,2-Dichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	trans-1,3-Dichloropropylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	trans-1,4-dichloro-2-butene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Trichloroethylene	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Trichlorofluoromethane	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Vinyl acetate	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Vinyl Chloride	0.2	0.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Xylenes, Total	0.6	1.5	ug/L
EPA 8260D	Volatile Organics, 8260 - Comprehensive	Water	Chlorodifluoromethane (Freon 22)	0.2	0.5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Semivolatile Organic Compounds						
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,1-Biphenyl	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2,4,5-Tetrachlorobenzene	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2,4-Trichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2-Dichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,2-Diphenylhydrazine (as Azobenzene)	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,3-Dichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	1,4-Dichlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,3,4,6-Tetrachlorophenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4,5-Trichlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4,6-Trichlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dichlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dimethylphenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dinitrophenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,4-Dinitrotoluene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2,6-Dinitrotoluene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Chloronaphthalene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Chlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Methylnaphthalene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Methylphenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Nitroaniline	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	2-Nitrophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	3- & 4-Methylphenols	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	3,3-Dichlorobenzidine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	3-Nitroaniline	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4,6-Dinitro-2-methylphenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Bromophenyl phenyl ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Chloro-3-methylphenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Chloroaniline	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Chlorophenyl phenyl ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Nitroaniline	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	4-Nitrophenol	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Acenaphthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Acenaphthylene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Acetophenone	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Aniline	83.5	167	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Anthracene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Atrazine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzaldehyde	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzidine	83.5	167	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(a)anthracene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(a)pyrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(b)fluoranthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(g,h,i)perylene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(k)fluoranthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzoic acid	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzyl alcohol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzyl butyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-chloroethoxy)methane	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-chloroethyl)ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-chloroisopropyl)ether	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Bis(2-ethylhexyl)phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Caprolactam	41.7	83.3	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Carbazole	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Chrysene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Dibenzo(a,h)anthracene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Dibenzofuran	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Diethyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Dimethyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Di-n-butyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Di-n-octyl phthalate	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Diphenylamine	41.7	83.3	ug/kg

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Semivolatile Organic Compounds						
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Fluoranthene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Fluorene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachlorobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachlorobutadiene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachlorocyclopentadiene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Hexachloroethane	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Indeno(1,2,3-cd)pyrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Isophorone	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Naphthalene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Nitrobenzene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	N-Nitrosodimethylamine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	N-nitroso-di-n-propylamine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	N-Nitrosodiphenylamine	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Pentachlorophenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Phenanthrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Phenol	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Pyrene	20.9	41.7	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Pyridine	83.5	167	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Soil	Benzo(a)pyrene (BAP) Equivalent-BAPE	146	292	ug/kg
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,1-Biphenyl	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2,4,5-Tetrachlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2,4-Trichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2-Dichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,2-Diphenylhydrazine (as Azobenzene)	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,3-Dichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	1,4-Dichlorobenzene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,3,4,6-Tetrachlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4,5-Trichlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4,6-Trichlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dichlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dimethylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dinitrophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,4-Dinitrotoluene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2,6-Dinitrotoluene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Chloronaphthalene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Chlorophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Methylnaphthalene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Methylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Nitroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	2-Nitrophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	3- & 4-Methylphenols	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	3,3-Dichlorobenzidine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	3-Nitroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4,6-Dinitro-2-methylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Bromophenyl phenyl ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Chloro-3-methylphenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Chloroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Chlorophenyl phenyl ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Nitroaniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	4-Nitrophenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Acenaphthene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Acenaphthylene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Acetophenone	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Aniline	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Anthracene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Atrazine	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzaldehyde	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzidine	10	20	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(a)anthracene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(a)pyrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(b)fluoranthene	0.05	0.05	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Semivolatile Organic Compounds						
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(g,h,i)perylene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzo(k)fluoranthene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzoic acid	25	50	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzyl alcohol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Benzyl butyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-chloroethoxy)methane	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-chloroethyl)ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-chloroisopropyl)ether	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Bis(2-ethylhexyl)phthalate	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Caprolactam	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Carbazole	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Chrysene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Dibenzo(a,h)anthracene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Dibenzofuran	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Diethyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Dimethyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Di-n-butyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Di-n-octyl phthalate	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Diphenylamine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Fluoranthene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Fluorene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachlorobenzene	0.02	0.02	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachlorobutadiene	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachlorocyclopentadiene	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Hexachloroethane	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Indeno(1,2,3-cd)pyrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Isophorone	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Naphthalene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Nitrobenzene	0.25	0.25	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	N-Nitrosodimethylamine	0.5	0.5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	N-nitroso-di-n-propylamine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	N-Nitrosodiphenylamine	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Pentachlorophenol	0.25	0.25	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Phenanthrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Phenol	2.5	5	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Pyrene	0.05	0.05	ug/L
EPA 8270E	Semi-Volatiles, 8270 - Comprehensive	Water	Pyridine	2.5	5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Pesticides						
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDD	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDD [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDE	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDE [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDT	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	4,4'-DDT [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Aldrin	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Aldrin [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-BHC	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-BHC [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-Chlordane	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	alpha-Chlordane [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	beta-BHC	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	beta-BHC [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Chlordane, total	6.6	6.6	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Chlordane, total [2C]	6.6	6.6	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	delta-BHC	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	delta-BHC [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Dieldrin	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Dieldrin [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan I	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan I [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan II	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan II [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan sulfate	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endosulfan sulfate [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin aldehyde	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin aldehyde [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin ketone	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Endrin ketone [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-BHC (Lindane)	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-BHC (Lindane) [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-Chlordane	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	gamma-Chlordane [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor epoxide	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Heptachlor epoxide [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Methoxychlor	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Methoxychlor [2C]	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Toxaphene	33	33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Toxaphene [2C]	33	33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Soil	Mirex	0.33	0.33	ug/kg
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDD	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDD [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDE	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDE [2C]	0.004	0.004	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Pesticides						
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDT	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	4,4'-DDT [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Aldrin	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Aldrin [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-BHC	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-BHC [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-Chlordane	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	alpha-Chlordane [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	beta-BHC	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	beta-BHC [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Chlordane, total	0.02	0.02	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Chlordane, total [2C]	0.02	0.02	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	delta-BHC	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	delta-BHC [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Dieldrin	0.002	0.002	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Dieldrin [2C]	0.002	0.002	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan I	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan I [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan II	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan II [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan sulfate	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endosulfan sulfate [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin aldehyde	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin aldehyde [2C]	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin ketone	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Endrin ketone [2C]	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-BHC (Lindane)	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-BHC (Lindane) [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-Chlordane	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	gamma-Chlordane [2C]	0.01	0.01	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor epoxide	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Heptachlor epoxide [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Methoxychlor	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Methoxychlor [2C]	0.004	0.004	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Toxaphene	0.1	0.1	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Toxaphene [2C]	0.1	0.1	ug/L
EPA 8081B	Pesticides, 8081 target list	Water	Mirex	0.004	0.004	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Polychlorinated Biphenyls						
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1016	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1016 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1221	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1221 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1232	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1232 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1242	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1242 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1248	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1248 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1254	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1254 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1260	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1260 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1262	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1262 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1268	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Aroclor 1268 [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Total PCBs	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Soil	Total PCBs [2C]	0.0167	0.0167	mg/kg
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1016	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1016 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1221	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1221 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1232	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1232 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1242	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1242 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1248	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1248 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1254	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1254 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1260	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1260 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1262	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1262 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1268	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Aroclor 1268 [2C]	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Total PCBs	0.05	0.05	ug/L
EPA 8082A	Polychlorinated Biphenyls (PCB)	Water	Total PCBs [2C]	0.05	0.05	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Herbicides						
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-T	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-T [2C]	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-TP (Silvex)	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4,5-TP (Silvex) [2C]	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4-D	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Soil	2,4-D [2C]	20	20	ug/kg
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-T	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-T [2C]	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-TP (Silvex)	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4,5-TP (Silvex) [2C]	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4-D	5	5	ug/L
EPA 8151A	Herbicides, NYSDEC Part 375 Target List	Water	2,4-D [2C]	5	5	ug/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Metals						
EPA 6010D	Metals, Target Analyte	Soil	Aluminum	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Antimony	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Arsenic	1.25	1.25	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Barium	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Beryllium	0.042	0.042	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Cadmium	0.25	0.25	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Calcium	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Chromium	0.417	0.417	mg/kg
EPA 7196A	Metals, Target Analyte	Soil	Hexavalent Chromium	0.35	0.5	mg/kg
EPA 7196A	Metals, Target Analyte	Soil	Trivalent Chromium	0.25	0.5	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Cobalt	0.333	0.333	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Copper	1.67	1.67	mg/kg
EPA 9013A	Metals, Target Analyte	Soil	Cyanide	0.5	0.5	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Iron	20.8	20.8	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Lead	0.417	0.417	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Magnesium	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Manganese	0.417	0.417	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Nickel	0.83	0.83	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Potassium	4.17	4.17	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Selenium	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Silver	0.42	0.42	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Sodium	41.7	41.7	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Thallium	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Vanadium	0.83	0.83	mg/kg
EPA 6010D	Metals, Target Analyte	Soil	Zinc	2.08	2.08	mg/kg
EPA 6010D	Metals, Target Analyte	Water	Aluminum	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Antimony	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Arsenic	0.015	0.015	mg/L
EPA 6010D	Metals, Target Analyte	Water	Barium	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Beryllium	0.0005	0.0005	mg/L
EPA 6010D	Metals, Target Analyte	Water	Cadmium	0.003	0.003	mg/L
EPA 6010D	Metals, Target Analyte	Water	Calcium	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Chromium	0.005	0.005	mg/L
EPA 7196A	Metals, Target Analyte	Water	Hexavalent Chromium	0.01	0.01	mg/L
EPA 7196A	Metals, Target Analyte	Water	Trivalent Chromium	0.008	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Cobalt	0.004	0.004	mg/L
EPA 6010D	Metals, Target Analyte	Water	Copper	0.02	0.02	mg/L
EPA 9013A	Metals, Target Analyte	Water	Cyanide	0.01	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Iron	0.25	0.25	mg/L
EPA 6010D	Metals, Target Analyte	Water	Lead	0.005	0.005	mg/L
EPA 6010D	Metals, Target Analyte	Water	Magnesium	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Manganese	0.005	0.005	mg/L
EPA 6010D	Metals, Target Analyte	Water	Nickel	0.01	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Potassium	0.05	0.05	mg/L
EPA 6010D	Metals, Target Analyte	Water	Selenium	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Silver	0.005	0.005	mg/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Metals						
EPA 6010D	Metals, Target Analyte	Water	Sodium	0.5	0.5	mg/L
EPA 6010D	Metals, Target Analyte	Water	Thallium	0.025	0.025	mg/L
EPA 6010D	Metals, Target Analyte	Water	Vanadium	0.01	0.01	mg/L
EPA 6010D	Metals, Target Analyte	Water	Zinc	0.025	0.025	mg/L

Analysis	Matrix	Analyte	MDL	RL	Units
PFAS Compounds					
PFAS, EPA 1633 Target List	Soil	Perfluorobutanesulfonic acid (PFBS)	0.111	0.177	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorohexanoic acid (PFHxA)	0.053	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoroheptanoic acid (PFHpA)	0.105	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorohexanesulfonic acid (PFHxS)	0.179	0.183	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorooctanoic acid (PFOA)	0.172	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorooctanesulfonic acid (PFOS)	0.167	0.186	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorononanoic acid (PFNA)	0.189	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorodecanoic acid (PFDA)	0.191	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoroundecanoic acid (PFUnA)	0.198	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorododecanoic acid (PFDoA)	0.163	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorotridecanoic acid (PFTrDA)	0.125	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorotetradecanoic acid (PFTA)	0.103	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-MeFOSAA	0.148	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-EtFOSAA	0.194	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoropentanoic acid (PFPeA)	0.109	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-octanesulfonamide (FOSA)	0.146	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-heptanesulfonic acid (PFHpS)	0.155	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-decanesulfonic acid (PFDS)	0.191	0.193	ug/kg
PFAS, EPA 1633 Target List	Soil	1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	0.595	0.76	ug/kg
PFAS, EPA 1633 Target List	Soil	1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	0.755	0.768	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-n-butanoic acid (PFBA)	0.109	0.8	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	0.139	0.356	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-3,6-dioxaheptanoic acid (NFDHA)	0.193	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-4-oxapentanoic acid (PFMPA)	0.062	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-5-oxahexanoic acid (PFMBA)	0.096	0.4	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-pentanesulfonate (PFPeS)	0.157	0.188	ug/kg
PFAS, EPA 1633 Target List	Soil	1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	0.595	0.75	ug/kg
PFAS, EPA 1633 Target List	Soil	HFPO-DA (Gen-X)	0.608	0.8	ug/kg
PFAS, EPA 1633 Target List	Soil	11CL-PF3OUdS	0.311	0.756	ug/kg
PFAS, EPA 1633 Target List	Soil	9CL-PF3ONS	0.246	0.748	ug/kg
PFAS, EPA 1633 Target List	Soil	ADONA	0.174	0.756	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluorododecanesulfonic acid (PFDoS)	0.169	0.194	ug/kg
PFAS, EPA 1633 Target List	Soil	Perfluoro-1-nonanesulfonic acid (PFNS)	0.124	0.192	ug/kg
PFAS, EPA 1633 Target List	Soil	3-Perfluoropropyl propanoic acid (FPrPA)	0.634	1	ug/kg
PFAS, EPA 1633 Target List	Soil	3-Perfluoropentyl propanoic acid (FPePA)	2.1	5	ug/kg
PFAS, EPA 1633 Target List	Soil	3-Perfluoroheptyl propanoic acid (FHpPA)	1.5	5	ug/kg
PFAS, EPA 1633 Target List	Soil	N-MeFOSE	0.611	2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-MeFOSA	0.18	0.2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-EtFOSE	0.697	2	ug/kg
PFAS, EPA 1633 Target List	Soil	N-EtFOSA	0.198	0.2	ug/kg
PFAS, EPA 1633 Target List	Water	Perfluorobutanesulfonic acid (PFBS)	0.47	1.77	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorohexanoic acid (PFHxA)	0.35	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoroheptanoic acid (PFHpA)	0.71	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorohexanesulfonic acid (PFHxS)	0.68	1.83	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorooctanoic acid (PFOA)	0.42	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorooctanesulfonic acid (PFOS)	0.82	1.86	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorononanoic acid (PFNA)	0.52	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorodecanoic acid (PFDA)	0.75	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoroundecanoic acid (PFUnA)	1.13	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorododecanoic acid (PFDoA)	0.88	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorotridecanoic acid (PFTrDA)	0.74	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorotetradecanoic acid (PFTA)	0.69	2	ng/L

Analysis	Matrix	Analyte	MDL	RL	Units
PFAS Compounds					
PFAS, EPA 1633 Target List	Water	N-MeFOSAA	0.79	2	ng/L
PFAS, EPA 1633 Target List	Water	N-EtFOSAA	1.03	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoropentanoic acid (PFPeA)	0.23	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-octanesulfonamide (FOSA)	0.88	2	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-heptanesulfonic acid (PFHpS)	0.91	1.91	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-decanesulfonic acid (PFDS)	1.32	1.93	ng/L
PFAS, EPA 1633 Target List	Water	1H,1H,2H,2H-Perfluorooctanesulfonic acid (6:2 FTS)	1.06	7.6	ng/L
PFAS, EPA 1633 Target List	Water	1H,1H,2H,2H-Perfluorodecanesulfonic acid (8:2 FTS)	2.05	7.68	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-n-butanoic acid (PFBA)	0.33	8	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro(2-ethoxyethane)sulfonic acid (PFEESA)	0.5	3.56	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-3,6-dioxaheptanoic acid (NFDHA)	2.14	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-4-oxapentanoic acid (PFMPA)	0.25	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-5-oxahexanoic acid (PFMBA)	0.37	4	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-pentanesulfonate (PFPeS)	0.76	1.88	ng/L
PFAS, EPA 1633 Target List	Water	1H,1H,2H,2H-Perfluorohexanesulfonic acid (4:2 FTS)	1.79	7.5	ng/L
PFAS, EPA 1633 Target List	Water	HFPO-DA (Gen-X)	3.23	8	ng/L
PFAS, EPA 1633 Target List	Water	11CL-PF3OUdS	1.38	7.56	ng/L
PFAS, EPA 1633 Target List	Water	9CL-PF3ONS	0.7	7.48	ng/L
PFAS, EPA 1633 Target List	Water	ADONA	0.53	7.56	ng/L
PFAS, EPA 1633 Target List	Water	Perfluorododecanesulfonic acid (PFDoS)	0.93	1.94	ng/L
PFAS, EPA 1633 Target List	Water	Perfluoro-1-nonanesulfonic acid (PFNS)	0.86	1.92	ng/L
PFAS, EPA 1633 Target List	Water	3-Perfluoropropyl propanoic acid (FPrPA)	2.03	5	ng/L
PFAS, EPA 1633 Target List	Water	3-Perfluoropentyl propanoic acid (FPePA)	7.33	25	ng/L
PFAS, EPA 1633 Target List	Water	3-Perfluoroheptyl propanoic acid (FHpPA)	9.47	25	ng/L
PFAS, EPA 1633 Target List	Water	N-MeFOSE	3.99	20	ng/L
PFAS, EPA 1633 Target List	Water	N-MeFOSA	1.58	2	ng/L
PFAS, EPA 1633 Target List	Water	N-EtFOSE	3.99	20	ng/L
PFAS, EPA 1633 Target List	Water	N-EtFOSA	1.8	2	ng/L

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,1,2-Tetrachloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,1-Trichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,2,2-Tetrachloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,2-Trichloro-1,2,2-trifluoroethane (Freon 113)	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1,2-Trichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1-Dichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,1-Dichloroethylene	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2,4-Trichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2,4-Trimethylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dibromoethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichloropropane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,2-Dichlorotetrafluoroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3,5-Trimethylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3-Butadiene	0.3	0.3	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3-Dichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,3-Dichloropropane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,4-Dichlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	1,4-Dioxane	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	2-Butanone	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	2-Hexanone	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	3-Chloropropene	0.5	0.5	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	4-Methyl-2-pentanone	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Acetone	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Acrolein	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Acrylonitrile	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Benzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Benzyl chloride	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Bromodichloromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Bromoform	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Bromomethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Carbon disulfide	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Carbon tetrachloride	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chlorobenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chloroethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chloroform	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Chloromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	cis-1,2-Dichloroethylene	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	cis-1,3-Dichloropropylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Cyclohexane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Dibromochloromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Dichlorodifluoromethane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Ethanol	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Ethyl acetate	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Ethyl Benzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Hexachlorobutadiene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Isopropanol	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Isopropylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Methyl Methacrylate	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Methyl tert-butyl ether (MTBE)	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Methylene chloride	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Naphthalene	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Butylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Heptane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Hexane	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	n-Propylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	o-Xylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	p- & m- Xylenes	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	p-Ethyltoluene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	p-Isopropyltoluene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Propylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	sec-Butylbenzene	0.1	0.1	ppbv

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Styrene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	tert-Butylbenzene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Tetrachloroethylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Tetrahydrofuran	0.2	0.2	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Toluene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	trans-1,2-Dichloroethylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	trans-1,3-Dichloropropylene	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Trichloroethylene	0.025	0.025	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Trichlorofluoromethane (Freon 11)	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Vinyl acetate	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Vinyl bromide	0.1	0.1	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Vinyl Chloride	0.05	0.05	ppbv
EPA TO-15	Volatile Organics, EPA TO15 Full List	Air	Xylenes, Total	0.3	0.3	ppbv

Specific Method	Analysis	Matrix	Analyte	MDL	RL	Units
Volatile Organic Compounds						
EPA TO-15	VOA, TO15 Isooctane (2,2,4-TMP) Add On	Air	2,2,4-Trimethylpentane	0.025	0.05	ppbv

ATTACHMENT C

ANALYTICAL METHODS/
QUALITY ASSURANCE SUMMARY TABLE

ATTACHMENT C

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Groundwater	Temperature, Turbidity, pH, ORP, Conductivity	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C; HCl to pH <2;no headspace	Three 40-mL VOC vials with Teflon®-lined cap	Analyze within 14 days of collection	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		1,4-dioxane	8270D SIM isotope dilution	Cool to 4°C	One 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TAL Metals	EPA 6020B, EPA 7470A	Cool to 4°C; HNO_3	250 ml plastic	6 months, except Mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	250 ml plastic	24 hours					
		Cyanide	EPA 9010C/9012B	Cool to 4°C; NaOH plus 0.6g ascorbic acid	250 ml plastic	14 days					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	Two 1-Liter Amber Glass	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	Two 1-Liter Amber Glass for Pesticides/PCB	7 days to extract, 40 days after extraction to analysis					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C		7 days to extract, 40 days after extraction to analysis					
		Per- and polyfluoroalykl substances (PFAS)	EPA 537(M) Rev 1.1	Cool to 4°C, Trizma	One 8-oz pre-certified PFAS-free plastic container	14 days	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	NA	NA	1 per 20 samples (minimum 1)

ATTACHMENT C

ANALYTICAL METHODS/QUALITY ASSURANCE SUMMARY TABLE

Matrix Type	Field Parameters	Laboratory Parameters	Analytical Methods	Sample Preservation	Sample Container Volume and Type	Sample Hold Time	Field Duplicate Samples	Equipment Blank Samples	Trip Blank Samples	Ambient Air Samples	MS/MSD Samples
Soil	Total VOCs via PID	Part 375 + TCL VOCs	EPA 8260C	Cool to 4°C	Two 40-ml VOC vials with 5ml H_2O, one with MeOH or 3 En Core Samplers (separate container for % solids)	48 hours after sampling if samples are not frozen to -7° C, 14 days after extraction to analysis	1 per 20 samples (minimum 1)	1 per 20 samples (minimum 1)	1 per shipment of VOC samples	NA	1 per 20 samples
		Part 375 + TCL SVOCs	EPA 8270D	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis			NA		
		Part 375 + TAL Metals	EPA 6010D, EPA 7471B, EPA 7196A, EPA 9010C/9012B	Cool to 4°C	2 oz. amber glass jar	6 months, except mercury 28 days					
		Hexavalent Chromium	EPA 7196A	Cool to 4°C	4 oz. amber glass jar	30 days					
		Cyanide	EPA 9010C/9012B	Cool to 4°C	8 oz. amber glass jar	14 days					
		Part 375 + TCL Pesticides	EPA 8081B	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Part 375 + TCL Herbicides	EPA 8151A	Cool to 4°C	8 oz. amber glass jar	14 days					
		Part 375 + TCL PCBs	EPA 8082A	Cool to 4°C	4 oz. amber glass jar	14 days extract, 40 days after extraction to analysis					
		Per- and polyfluoroalykl substances (PFAS)	EPA 537(M) Rev 1.1	Cool to 4°C, Trizma	Two 250 mL high density polyethylene (HDPE) bottles	14 days					
Soil Vapor	Total VOCs and Methane with MultiGas Meter	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	NA	NA	1 per 10 samples (minimum 1)	NA
Ambient Air	Total VOCs via PID	TO-15 Listed VOCs	TO-15	Ambient Temperature	6-Liter Summa Canister	Analyze within 30 days of collection	1 per 20 samples (minimum 1)	NA	NA	1 per 10 samples (minimum 1)	NA

Notes:

1. PID - Photoionization Detector
2. VOC - Volatile organic compound
3. EPA - Environmental Protection Agency
4. TCL - Target compound list
5. TAL - Target analyte list
6. ORP - Oxidation-reduction-potential
7. NA - Not applicable

ATTACHMENT D

SAMPLE NOMENCLATURE STANDARD OPERATING PROCEDURE

SOP #01 – Sample Nomenclature

INTRODUCTION

The Langan Environmental Group conducts an assortment of site investigations where samples (Vapor, Solids, and Aqueous) are collected and submitted to analytical laboratories for analysis. The results of which are then evaluated and entered into a data base allowing quick submittal to the state regulatory authority (New York State Division of Environmental Conservation [NYSDEC]). In addition, Langan is linking their data management system to graphic and analytical software to enable efficient evaluation of the data as well as creating client-ready presentational material.

SCOPE AND APPLICATION

This Standard Operating Procedure (SOP) is applicable to the general framework for labeling vapor, solid (soil) and aqueous (groundwater) samples that will be submitted for laboratory analysis. The nomenclature being introduced is designed to meet the NYSDEC EQuIS standard and has been incorporated into Langan software scripts to assist project personnel in processing the data. While this SOP is applicable to all site investigation; unanticipated conditions may arise which may require considerable flexibility in complying with this SOP. Therefore, guidance provided in this SOP is presented in terms of general steps and strategies that should be applied; but deviation from this SOP must be reported to the Project Manager (PM) immediately.

GENERAL SAMPLE IDENTIFICATION CONSIDERATIONS

Sample Labels

All sample ware must have a label. Recall that when you are using the Encore™ samples (see below); they are delivered in plastic lined foil bags. You are to label the bags[1]:



All other samples containers including Terra Cores™ must be labeled with laboratory provided self-adhesive labels.

Quick Breakdown of Sample Format

The general format for sample nomenclature is:

[1]Both Alpha and York laboratories permit the combining of the three Encore™ into a single bag. This may not be appropriate for all laboratories so please confirm with the labs themselves

LLNN_ID

Where

LL is a grouping of two (2) to four (4) letters signifying the sample media source. In older nomenclature SOPs this portion of the sample identification is commonly referred to as the *Sample Investigation Code*

NN represents a two digit number identifying the specific sample location or sample sequence number

_ ***(underscore)*** is required between the sample lettering and numeric identification and additional modifying data that determines the date of sampling or the depth of the sample interval

ID is a modifier specific to the sample type media (depth of soil sample or date of groundwater sample)

LL – Sample Investigation Code

Langan has devised a list of two to four letters to insure a quick ability to identify the sample investigation.

Code	Investigation
AA	Ambient Air
DS	Drum
EPB	Endpoint Location - Bottom (Excavation)
EPSW	Endpoint Location - Sidewall (Excavation)
FP	Free Product
IA	Indoor Air
IDW	Investigation Derived Waste (Soil Pile)
MW	Monitoring Well (Permanent)
SB	Soil Boring
SG	Staff Gauge (Stream Gauging)
SL	Sludge
SV	Soil Vapor Point
SVE	Soil Vapor Extraction Well
SW	Surface Water
TMW	Temporary Monitoring Well
TP	Test Pit (Excavated Material from Test Pit Not Associated With Sidewall or Bottom Samples)
WC	Waste Characterization Boring
COMP	Composite Sample
TB	Trip Blank (QA/QC Sampling – All Investigations)
FB	Field Blank (QA/QC Sampling – All Investigations)
DUP	Duplicate (QA/QC Sampling – All Investigations)

NN – Numeric Identifier

The two digit number that follows the sample investigation code (LL) identifies the specific sample based on the soil boring, monitoring well, endpoint or other location identification. For a subset of samples

where there is no specific location identifier, the two digit number is the sequence number for the sample submitted. For example, an aqueous sample from a monitoring well identified as MW-1 would have the sample investigation code of MW and the numeric identifier as 01. Note there is no hyphen. The same can be done for soil borings, a soil sample collected from soil boring 9 (SB-9) would be have the LLNN identification of SB09 (again, no hyphen).

Note however that there is a subset of samples related to laboratory analytical quality assurance, among these includes TB, FB, and DUP. On many investigations, the Scope will require multiple collections of these types of samples, therefore the numerical number represents the sequence sample count where the first sample is 01, the second sample is 02, and the third sample is 03 and so on.

_ Underscore
The underscore is required. It separates the investigation code and numeric identifier from the modifier specific to the sample itself. Note that every effort should be made to insure that the underscore is clear on the sample label and chain of custody (COC).

ID – Modifier Specific to Type Media
Each sample investigation code and numeric identifier is further modified by an ID specific to the sample type media. In general, soil samples (soil borings or endpoint samples) use an ID that indicates the depth at which the sample was taken. Aqueous samples (groundwater or surface water samples) are identified by the date the sample was collected. Other types of samples including quality control (TB, FB, and DUP), Vapor samples (AA, IA, SV or SVE), other soil type samples (IDW, sludge, free product, drum, and others) are also identified by a date. The following rules apply to the ID when using sample depth or sample date.

Sample Depth
The sample depth must be whole numbers (no fractions) separated by a hyphen. Thus for a soil sample collected from the soil boring SB-1 from a depth of 6 feet to 8 feet, the sample would be identified as:

SB01_6-8

Unfortunately, the NYSDEC EQuIS system does not accept fractions. Therefore, if your sample interval is a fraction of a foot (6.5-7.5), round up to the larger interval (6-8).

Sample Date
The sample date is always in the format of MMDDYY. Note that the year is two digits. Thus for a groundwater sample collected on July 1, 2015 from the monitoring well MW-1, the sample would be identified as:

MW01_070115

Special Cases
There are a couple of specific sample types that require further explanation.

Endpoint Sampling
End point sidewall samples are sometimes modified by magnetic direction (N, S, E, and W). For example, the first sidewall endpoint sample from the north wall of an excavation at a depth of 5 feet would be written as:

EPSW01_N_5

Again, note that the N in the identification refers to north and is separated from the prefix investigation code/numeric identifier and ID modifier suffix by underscores.

Vapor Extraction Well Sample
As with the sidewall endpoint samples, the sample name is altered by inserting a middle modifier between the prefix and suffix of the sample name. The middle modifier is used to identify the source of the sample (inlet sample port, midpoint sample port or outlet sample port). For example the midpoint port of the vapor extraction well number 1 sampled on July 1, 2015 would be written as;

SVE01_MID_070115

Matrix Spike and Matrix Spike Duplicate
On occasion, a Langan investigation will collect a sample to be used to provide the lab with a site specific medium to spike to determine the quality of the analytical method. This special case of sampling requires additional information to be used in the sample name, specifically, a suffix specifying whether the sample is the matrix spike (MS) or the matrix spike duplicate (MSD). In the following example, the sample is collected from soil boring number 1 at a depth of 2-4 feet. For the matrix spike sample:

SB01_2-4_MS

and for the matrix spike duplicate sample:

SB01_2-4_MSD

Multiple Interval Groundwater Sampling
Although not currently a common practice, low flow sampling facilitates stratigraphic sampling of a monitoring well. If the scope requires stratigraphic sampling then groundwater samples will be labeled with a lower case letter following the well number. For example, placing the pump or sampling tube at 10 feet below surface in MW01 on July 1, 2015 would require the sample to be labeled as:

MW01a_070115

While a second sample where the pump or tubing intake is placed at 20 feet would be labeled as:

MW01b_070115

Note that it is important that you record what depth the intake for each sample represents in your field notes; as this information is going to be critical to interpreting the results.

ATTACHMENT E

PFAS SAMPLING PROTOCOL AND LABORATORY SOP

SOP #19: BEST PRACTICES FOR PFAS SAMPLING OF GROUNDWATER – APRIL 2019

This discussion is about best practices to assist you in groundwater sampling for Per- and Poly-Fluoro Alkyl Substances (PFAS). The current discussion surrounding PFAS sampling is long on assumption and short on research. As such, the best guidance is a discussion of best practices. Please review PFAS Sampling Best Practices (PFAS-SBP) in planning and implementing PFAS sampling activities. As more information becomes available, this best practices document will be updated. Be sure you are reviewing the most recent version when planning PFAS sampling activities. Copies of best practices will be stored on the server at \\langan.com\data\NYC\other\environmental group\SOPs\12 Low Flow Groundwater Sampling\PFAS Best Practices.

This version of PFAS-SBP will briefly discuss field safety and personal protection equipment (PPE), clothing and personal hygiene, sampling equipment, sampling documentation and labeling, and sampling procedure:

Safety:

Staff safety is still paramount. The following equipment must be donned at PFAS sampling events – no exceptions.

- All sites
  - Safety Glasses
  - Powderless Nitrile (no latex)
  - Safety Shoes – Note that safety shoes are commonly treated to be water-resistant or water proof with a PFAS type material, therefore, staff must don natural rubber overboots.



Figure 1 ONGUARD Disposable Natural Rubber Overshoe (Part No. 97591LG00 [large])[1]

[1] Available in the environmental closet

- Construction Sites
    - Langan Hardhat
    - Langan reflective vest (yellow reflective jacket not permitted for PFAS sampling)
    - Hearing protection as required.

Clothing and Personal Hygiene

As a first approximation, any clothing advertised as waterproof, water-repellant, or dirt and/or stain resistant should not be donned for PFAS sampling activities. In addition, clothing designed to block ultraviolet protection should also be avoided. Fabric Softeners and ant-static ingredients in clothing detergents should also be avoided.

Clothing from synthetic and natural fibers (cotton) are acceptable, as a precaution, do not wear new clothing into the field. Plain uncoated Tyvek™ is acceptable for use when sampling as it does not contain PFAS. Coated Tyvek™ is not acceptable as the suits are usually treated with PFAS type material unless deemed necessary with no alternative PPE from a health and safety perspective.

When sampling in cold weather, consider layers for warmth since most jackets are treated with waterproofing material. However, in the event of wet weather, please use the PVC rain gear (e.g. River City Garment 3-piece Rain Gear 35mm PVC/polyester suits [Part no. 5500009600 {large}]).[2]

The literature abounds with differing recommendations regarding personal hygiene products. In general, avoid hair and body wash products that include conditioning agents. Most important, if you have long hair, pin it back to avoid having to touch your hair with your hands during sampling activities.

There is a limited number of products available to meet field insect repellent (insect repellent with Deet or derived from100% organic ingredients) and sunscreen requirement when sampling for PFAS. A list of suitable products will be provided as they become available. When using approved insect repellent and sunscreen products, be sure to apply away from the sampling area and to wash your hands after applying.

As a side note, do not eat or consume beverages during sampling activities. When drinking beverages to avoid dehydration, do so away from the sampling area and remove your nitrile gloves. Don a new set of gloves after consuming the beverage. Consume all meals away from the sampling area, use wax paper where possible to wrap your meal. If purchasing your meal,

[2] Available in the environmental closet

consume off-site and wash your hand thoroughly after your meal to prevent transference of potential PFAS compounds from food packaging.

Sampling Equipment

- Pumps – In general, pumps (and other sampling equipment including the Solinst interface probe) having parts containing fluoropolymer and should be avoided where possible. The following pumps are acceptable.
    - Peristaltic is the best option when depth to water is less than 20-feet.
    - Bladder pumps (QED Sample Pro, or equivalent[3]) are the only currently available option to sample for PFAS when depth to water is greater than 20-feet.
    - Inertial pumps (Waterra, or equivalent) while suitable for PFAS sampling are not to be used because they are very difficult to operate within the proscribed flow rate defined in low flow sampling guidances. They also are unsuitable for VOC sampling if the sampling plan is coupled with traditional analytes.
    - *Three are no other submersible pumps (including Monsoon pumps) that have preliminary data to substantiate being PFAS-free and are readily available*.
- Tubing – In general, tubing containing fluoropolymers are prohibited.
    - Silicon tubing if permitted
    - High-density polyethylene (HDPE) tubing is permitted
    - Low-density polyethylene (LDPE) tubing is permissible by the US Navy and a limited number of other agencies (Michigan) but is still considered questionable by many state and local authorities including the NYSDEC. Therefore, its use should only be considered when an alternative is not available and prior approval from project managers and potentially regulators may be necessary. Further additional QA/QC samples are suggested when using this material.
- Note passive samples such as HydraSleeve samplers (made from LDPE) may be an option; however, regulatory approval should be obtained prior to sampling and may require additional QA/QC to prove they do not bias or effect sample results.
- If a piece of equipment containing fluoropolymer parts must be used (depth to water probes or interface probes (e.g. Solinst) or an acceptable alternative cannot be found, an equipment blank of that piece of equipment should be submitted for analysis as a QA/QC measure.

Sampling Documentation and Labeling

Documentation remains extremely important. There are general rules that apply to PFAS sampling:

[3] QED has provided company run test results demonstrating the Sample Pro is PFAS-free, currently there is no independent testing on sampling equipment. Only use pumps that have some laboratory basis for being PFAS-free.

- Use ballpoint pens and pencils to complete labels and record field notes. There is no consensus of Sharpie® markers, therefore, avoid completing labels with anything but ballpoint pens.
- Aluminum, Masonite and polypropylene (including Langan) clipboards are suitable for holding loose papers.
- There is no consensus around the suitability of "Rite-in-Rain"™ notebooks on PFAS sampling sites. Some states including Michigan do permit them but not the U.S. Navy. Until further information is available, do not use any types of waterproof field books during PFAS sampling. If you have a field map anointed with post-its, transfer the information to the map. Post-it, or any other adhesive paper pad is not suitable for PFAS sampling sites. Only use loose paper for written note taking.
- Standard practice should be to use a Langan tablet with the low flow sampling spreadsheet preloaded. It is recommended that you print out a number of hard copies of the spreadsheet should the tablet fail.
- Use lab supplied labels only.

Sampling Procedure

Langan will follow standard low flow procedures and stability criteria when sampling for PFAS. This applies to those sampling events where only PFAS is being evaluated as well as when traditional sampling follows PFAS sampling. Note that when doing combined sampling events (PFAS and traditional analytes), sample for PFAS first. Where possible every effort should be made to use disposal and dedicated equipment for each sample location to avoid potential cross contamination and limit errors and issues from inadequate decontamination between samples.

Gauging

Gauging data will not be collected on monitoring wells subject to PFAS sampling. As stated, the Solinst interface probe is not suitable for gauging depth to water during PFAS sampling. However, prior to the field event, field staff, senior staff and the PM will discuss an alternative strategy to collect site wide synoptic groundwater gauging data after PFAS sampling is completed.

Decon Station

Use the three bucket procedure for decontaminating the bladder pump prior to sampling the first monitoring well and directly before each subsequent well. All the buckets should be filled with DI water supplied by the lab and confirmed to be PFAS-free. In some instances, the lab may be unable or unwilling to supply the quantities of PFAS-free water necessary for

decontamination. If the lab will not supply the volume required, use the DI water supplied by Pine and submit a blank analysis of the decon water with your QA/QC samples. Alconox®, Liquinox® or Citranox® are the only decontamination solutions currently cleared for sampling PFAS. On sites where PFAS sampling is scheduled over multiple days, have enough proper decon water to mix a new solution each day. Decontaminating the night before is not acceptable.

Ideally, the decon station should be set up on thin plastic sheeting; but the only material available is LDPE. As such, the best practice is to lay out the LDPE sheet, then cover the work area with clean cotton rags (environmental closet) to place the decontaminated bladder pump on. Avoid placing the pump or any of its parts directly on the plastic. Also submit a rinse sample - separate from the field blank, with your QA/QC samples.

Sampling Set Up

At each step during set up and sampling, best practices require changing nitrile gloves between each step. Remember, any time you do something out of procedure such as writing a field note, answering the phone or pushing your hair aside, you risk transference unless you change gloves.

Stage the pump supporting equipment (compressor, battery, etc.), buckets, water quality meter (Horiba), lab coolers and other equipment at least 5-feet away from the open wellhead. Do not stage any unnecessary equipment or cases near the wellhead during sampling. If it isn't directly related to sampling the well in question, leave it staged in a central area away from the wellheads.

When inserting the tubing into the well, it's important to keep the tubing that will come in contact with the water table from coming into contact with the surrounding platform (concrete/asphalt/soil apron around the well) which can serve as a source of transference. This is especially difficult when using HDPE tubing. The best method is to patiently unroll off your arm into the well. Use PVC cutters to cut the tubing.

Connect the tubing to the water quality meter through a bridge of silicon tubing. This will give a bit of extra flexibility in setting up, especially on cold days.

Stability

There are two important items to remember during the period when you are tracking stability:

- Do not allow the pump to stop, backflow from the water quality meter can pose a

significant risk of cross contamination. If you must shut down, disconnect the pump to water quality meter feed line before turning off the pump.

- While you can fill out the labels (remember to change gloves), do not set up the sample bottles until you are ready to sample.

Sampling

- Once stability is achieved (or an hour has passed), change gloves again, then pull the pump to water quality meter tubing from the water quality meter, change gloves and begin collecting the samples.
- At a minimum, the PFAS sample bottles must be filled to container neck. Do not under fill.



- After sampling groundwater, you can allow the tubing to discharge to a bucket while you set up for PFAS field blanks. Change gloves, then prepare the field blanks.
    - Transfer the reagent water from the filled plastic container to the field blank container;
    - Both the empty Reagent Water container and the filled Field Blank container must be returned to the lab along with the samples taken.
- If the work plan is for sampling the standard suite of analytes (VOCs, SVOCs, etc.), then commence collecting those samples after completing the PFAS and PFAS field blank sampling.

Post Sampling

Place all disposable sampling material (tubing, discarded gloves, etc.) in a heavy duty garbage bag (environmental closet). Move pump to decon area. If using a bladder pump, decontaminate per instructions above. If using a peristaltic pump, change the silicon pump tubing using a new set of nitrile gloves. Then proceed to the next monitoring well location.

SOP 18 – BEST PRACTICES FOR PFAS SAMPLING IN SOIL – APRIL 2019

This discussion is about best practices to assist you in soil sampling for Per- and Poly-Fluoro Alkyl Substances (PFAS). Similar to groundwater sampling for PFAS, the current discussion surrounding PFAS sampling is long on assumption and short on research. As such, the best guidance is a discussion of best practices. Please review PFAS Sampling Best Practices (PFAS-SBP) in planning and implementing PFAS sampling activities. As more information becomes available, this best practices document will be updated. Be sure you are reviewing the most recent version when planning PFAS sampling activities. Copies of best practices will be stored on the server at \\langan.com\data\NYC\other\environmental group\SOPs\19 Best Practices for PFAS Sampling Soil.

This version of PFAS-SBP will briefly discuss field safety and personal protection equipment (PPE), clothing and personal hygiene, sampling equipment, sampling documentation and labeling, and sampling procedure:

Safety:

Staff safety is still paramount. The following equipment must be donned at PFAS sampling events – no exceptions.

- All sites
  - Safety Glasses
  - Powderless Nitrile (no latex)
  - Safety Shoes – Note that safety shoes are commonly treated to be water-resistant or water proof with a PFAS type material, therefore, staff must don natural rubber overboots.



Figure 1 ONGUARD Disposable Natural Rubber Overshoe (Part No. 97591LG00 [large])

- Construction Sites

[1] Available in the environmental closet

- Langan Hardhat
- Langan reflective vest, avoid yellow reflective jacket)
- Hearing protection as required.

Daily field notes should list the PPE donned when soil sampling.

Clothing and Personal Hygiene

As a first approximation, any clothing advertised as waterproof, water-repellant, or dirt and/or stain resistant should not be donned for PFAS sampling activities. In addition, clothing designed to block ultraviolet protection should also be avoided. Fabric Softeners and ant-static ingredients in clothing detergents should also be avoided.

Clothing from synthetic and natural fibers (cotton) are acceptable, as a precaution, do not wear new clothing into the field. Plain uncoated Tyvek™ is acceptable for use when sampling as it does not contain PFAS. Coated Tyvek™ is not acceptable as the suits are usually treated with PFAS type material unless deemed necessary with no alternative PPE from a health and safety perspective.

When sampling in cold weather, consider layers for warmth since most jackets are treated with waterproofing material. However, in the event of wet weather, please use the PVC rain gear (e.g. River City Garment 3-piece Rain Gear 35mm PVC/polyester suits [Part no. 5500009600 {large}]).[2]

The literature abounds with differing recommendations regarding personal hygiene products. In general, avoid hair and body wash products that include conditioning agents. Most important, if you have long hair, pin it back to avoid having to touch your hair with your hands during sampling activities.

There is a limited number of insect repellent and sunscreen products available in the marketplace that are suitable to don when sampling for PFAS. As of now, insect repellent with Deet or derived from100% organic ingredients material and water repellent sunscreen (as opposed to those advertised as withstanding a dip in a pool or will not succumb to sweat) are suitable for field work. A list of suitable products will be provided as they become available. When using approved insect repellent and sunscreen products, be sure to apply away from the sampling area and to wash your hands after applying.

As a side note, do not eat or consume beverages during sampling activities. When drinking

[2] Available in the environmental closet

beverages to avoid dehydration, do so away from the sampling area and remove your nitrile gloves. Don a new set of gloves after consuming the beverage. Consume all meals away from the sampling area, use wax paper where possible to wrap your meal. If purchasing your meal, consume off-site and wash your hand thoroughly after your meal to prevent transference of potential PFAS compounds from food packaging.

Drilling/Excavation Equipment

The principal of preventing cross contamination and the greatest challenge to sampling soil for PFAS compounds is the field practices of the drilling or excavation contractor. Currently, literature searches have not yielded insights into soil sampling for PFAS compounds. There is an equally lack of information on potential interference drilling and excavation practices can impact on PFAS analytical data. As such, the approach with regards to the drilling or excavation contractor is to insure they rigorously follow the approved decontamination practice. Attempting to implement additional controls on the drillers and excavation contractor at this time without significant independent assessment or refereed literature will undoubtable added significant additional cost with little substantiated benefit. Langan should modify the quality assurance/quality control (QA/QC) sampling to provide a context for assessing the resulting analytical PFAS soil data.

Sampling Equipment

When sampling soil for PFAS compounds, Langan's responsibility is to initiate a soil sampling protocol that prevents the cross contamination of soil from the moment the open direct push liner or split spoon is put under the field staff's preview. The bullets below specify several key components:

- Langan field staff should change out nitrile gloves with each liner;
- The putty knife or other tool being used in assessing volatile organic compounds (VOCs) in soil by creating a slice in the sample soil column must be thoroughly decontaminated with each liner;
- Prior to further disturbance of the recovered soil column for soil description, the grab sample for volatile organic compounds (VOCs) should be collected from that segment of the soil sample column exhibiting the highest PID in accordance with the requirements of the work plan;
- In addition and also prior to further disturbance of the recovered soil compound, the soil samples being submitted for analysis of PFAS compounds should be collected in such a manner that it doesn't include samples previously disturbed for assessing PID or collecting the grab samples for VOCs. Remember to follow the requirements of the work plan. Note that the sampler should change out nitrile gloves between collected

the grab sample for VOCs and the collecting the sample for PFAS.

- After collecting the grab sample for VOCs and the sample for PFAS compounds, Langan staff may proceed with the detail soil identification following Langan standards outlined in the Langan Field Investigation and Sampling Manual and instructions given in the Soil Identification Practical training; and
- After completing the soil identification description, Langan staff may proceed with collecting the remaining require soil samples in accordance with the work plan.

Sampling Documentation and Labeling

Documentation remains extremely important. There are general rules that apply to PFAS sampling:

- Use ballpoint pens and pencils to complete labels and record field notes. There is no consensus of Sharpie® markers, therefore, avoid completing labels with anything but ballpoint pens;
- Aluminum, Masonite and polypropylene (including Langan) clipboards are suitable for holding loose papers;
- There is no consensus around the suitability of "Rite-in-Rain"™ notebooks on PFAS sampling sites. Some states including Michigan do permit them but not the U.S. Navy. Until further information is available, avoid completing filling out any types of waterproof field books in the vicinity of the PFAS sampling. If you have a field map anointed with post-its, transfer the information to the map. Post-it, or any other adhesive paper pad is not suitable for PFAS sampling sites. Only use loose paper for written note taking; and
- Use lab supplied labels only.

Quality Assurance/Quality Control Sampling

A critical factor in understanding the soil analytical PFAS data is to gauge the possibility of interference. As such, the QA/QC requirements as they pertain to soil sampling might require modification. Best practices recommends the following:

- Duplicate soil samples for PFAS should be collected at the same rate as duplicate sampling for other parameters;
- Spike Matrix Sampling and Duplicate Spiked Matrix sampling should be collected at the same rate as similar sampling for other parameters;
- Separate PFAS Field Blanks should be incorporated into the Soil Field Blank Sampling program;
- The source of the driller rinse water (truck mounted tank or local water supply faucet)

should be sampled for PFAS analysis;

- A rinse sample collected from the cutting head of the sampling equipment should be collected for PFAS analysis following decontamination;
- The source of rinse water for the Langan decontamination process should also be collected for PFAS analysis;
- A rinse sample collected from the tool used to manipulate soil samples during PID assessment should also be submitted for PFAS analysis; and
- When preparing the PFAS field blank sample, remember to change gloves, then prepare the field blanks.
    - Transfer the reagent water from the filled plastic container to the field blank container;
    - Both the empty Reagent Water container and the filled Field Blank container must be returned to the lab along with the samples taken.

Post Sampling

Place all disposable sampling material in a heavy duty garbage bag (environmental closet). Move reusable sampling equipment to the decon staging area. Decontaminate per instructions above. Then proceed to the next soil sampling location.